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THE DETECTION
OF
CRIMINAL ABORTION,
AND A
STUDY OF FETICIDAL DRUGS.

BY
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HORATIO R. STORER, M.D., LL. B.

AS AN HUMBLE EVIDENCE OF ADMIRATION FOR HIS GENIUS;

AS A

SLIGHT RETURN FOR HIS BRAVE WORDS TO THE MEN AND WOMEN OF
HIS COUNTRY UPON THIS

CRIME OF THE PERIOD,

AND AS A

GRATEFUL CONSIDERATION FOR HIS CORDIAL RECOGNITION OF THE

LABORS OF

The Author.

PREFACE.

HORATIO H. SPENCER, M.D., LL.D.

is this manuscript is now in the hands of the author, and it is
to be seen, the author will be sufficiently repaid.

The greater portion—except one chapter, that on "Other Points in
the History of Intellectual Abstraction," which is entirely
new, published in the Journal of the Gynecological Society of Boston,
as a serial. To the manuscript, also, published in the same
Journal in many papers. These readers who are familiar with it in the
pages of the Gynecological Journal will at once recognize the value
of these additions.

The design of the paper is the history of the science in the
number of years of which the law takes no account, but with
which the physician is brought in contact. It also attempts
to render without the symptoms following the original use of
medical drugs.

It is not supposed that the physician is to turn detective or
historian, but surely this great evil cannot be too carefully avoided.

The author believes he has followed a path which was
highly successful, and he hopes the new facts he has been able to
present will lead to some more easy or successful mode of
treatment.

The author takes pleasure in acknowledging the assistance he has

PREFACE.

IF this monograph is received in the same spirit in which it is written, the author will be sufficiently repaid.

The greater portion — except one chapter, that on “Other Points in the Diagnosis of Instrumental Abortion,” which is added entire — was published in the Journal of the Gynæcological Society of Boston, as a serial. To the monograph, as so published, new matter has been added in many places. Those readers who are familiar with it in the pages of the Gynæcological Journal will at once recognize the value of these additions.

The design of the papers is the detection of the crime in the vast number of cases of which the law takes no cognizance, but with which the physician is brought in continual contact. It also attempts to render evident the symptoms following the criminal use of abortifacient drugs.

It is not supposed that the physician is to turn detective or informer, but surely this great evil cannot be too carefully or closely studied.

The author believes he has followed a path which was comparatively unexplored, and he hopes the new facts he has been able to present will tend to make more easy of recognition this crime of the period.

The author takes pleasure in acknowledging the obligations he is

under to his accomplished friend, Dr. John Van Duyn, of this city, for his assistance in many of the experiments.

Also, to Mr. H. E. Eaton, Druggist, for the use of chemicals, and facilities for experiment.

E. V. D. W.

STRACUSE, November 13, 1871.

THE DETECTION OF CRIMINAL ABORTION.

CHAPTER I.

INSTRUMENTAL ABORTION.

THE recollection of many attempts, occurring to myself and others, to conceal from the medical attendant the fact that a criminal abortion is in progress, inspires this paper. It is appropriately a paper of the period; an attempt to lay down rules for the recognition of those cases, regarded by society as half correct, and yet fully within the borders of crime-land.

In view of what may be safely regarded as a fact, that deception of this nature is often successfully attempted, I am induced to make an effort to systematize our knowledge of this important matter. No physician wishes to be made a Judas to betray unwittingly his master. [As society now looks upon this sin, we must be always on our guard. Wives will even make the hazardous attempt to keep both husband and physician in ignorance of the procured abortion.

I have reason to believe that there exist among us the Science and the Art of Abortion. The worship of the goddess Aphrodite finds its father-confessor in the foeticide.

The married woman, who gives to society the womanhood she ought to give to humanity, seeks the abortion-

ist, and by the outlay of a few dollars shirks the high destiny of a mother.]

The luxury of an abortion is now within the reach of the serving-girl. An old man in this city performs this service for *ten* dollars, and takes his pay in *instalments*.

Let the following instance illustrate the reckless disregard some women, who possess this moral obliquity, have of the rights of the husband. It is only a year or so ago, that a woman, young and interesting, and the wife of a young medical man, came to me for such a purpose. When I stated the certainty of detection by her husband, from the symptoms, she informed me, to my great surprise, that she had once successfully carried out such a plan of deception. Her husband supposed the "show" was a healthy renewal of her menses, which are oftentimes profuse, after an interruption of two or three months. I watched her from the window of my office, and saw her enter the den of a notorious abortionist nearly opposite. I have no doubt of her success in again deceiving her husband. He was a man of average medical attainment, and had served as a surgeon during the late war.

For the physician to stand by the bedside of a patient, unconscious that such a sacrilege is being perpetrated in the holiest of a woman's nature, does him irreparable injury, and inflicts an equal amount of injury upon society.

Crime will increase in proportion to the lessening of its chances of detection.

That which renders the detection of these cases difficult is the early period of gestation in which criminal interference is procured. In the great majority, the third menstrual lapse is the signal for interference on the part of the woman. In a case that occurred to me

in January, 1871, a case of asserted interruption of the catamenial discharge "from taking cold," the patient, a young married woman, was two months pregnant. I detected the fraud on my third visit. Among women who have achieved the difficult feat of auto-catheterism of the uterine cavity, they usually probe themselves at the expiration of the first month, if the menses are tardy in their return. I know of several such model country-women; and have had many other cases of like nature related to me by other practitioners. Instances of self-probing at this early period rarely come under the notice of the medical man, except for hemorrhage, called by the patient "such a long time unwell," and then it is possible for the acutest physician to be at fault.

I think I may safely assert that the second and third months constitute the crisis in the uterine life of the foetus, among women who are subject to this moral obliquity. Generally, married women have a wholesome fear of criminal interference after the fourth month, from the belief that foetal life is then fully developed. This idea is the balm in Gilead to the conscience of every married woman; and the prevalent theory among "nice" women is, that before that time "no particular harm is done." It may be stated as a rule, that it is only among women who have a greater fear of children than of transgressing the divine ordinance, "Thou shalt not kill," that any measures are taken to arrest the progress of gestation after the period named. I speak of the married only, as no rule will apply to those who bear the fruit of illegitimate conception. The physician is called upon to visit two classes of cases.

(a.) Those in which the abortion is admitted, but its criminal cause denied.

(b.) Those in which the sickness is referred to some

cause foreign to a pending abortion. The first class (*a.*) is generally met with among married women, and of the two is the less difficult of detection. The woman generally refers the unhappy state to a fall, or blow, or the sudden knowledge of unhappy news, or alarm, or that an abortion is habitual with her, and she fears that she will never have a living child. She refers her condition to one or the other of the above causes with such an air of sincerity, that it seems pure heartlessness for her physician to doubt.

In the first place, it is reasonable ground for suspicion, that a miscarriage is occurring in a young married woman, of previously good health, between the second and third months. If an abortion occurs in those early months from any disease of the maternal system it is generally, according to the classification of M. Guillemot, ovular. Even syphilis, than which no disease affects the system of the mother more disastrously, does not usually endanger the product of conception until the later months. (Duval.) It is rare, and I think the experience of all physicians will sustain me, that a spontaneous abortion occurs between the third and fifth months.

The history of the woman being known, and her appearance verifying the history that there is no constitutional taint, or state of confirmed ill-health, the question to be considered is, Does the reason given by the woman amount to a sufficient cause for the abortion? The evidence upon this point may be gathered from two sources; the history, from the occurrence of the alleged cause to the time of examination, and the evidence furnished by the touch.

A fall or blow upon the abdomen should leave some point of soreness or ecchymosis upon a portion of the body favorable to an abortion; thus, a sore point, or

ecchymosis upon the shoulders, arms, or legs, although confirming the fact of the receipt of an injury, would not, in the absence of similar marks in regions obnoxious to an abortion, verify the statement of the patient. Still, in the case of a nervous, excitable woman, who had previously suffered a spontaneous abortion, due allowance should be given for the effects of shock. In a case that came to my notice some years back, the woman alleged that the miscarriage at between three and four months was caused by a kick upon the abdomen from the husband, and exhibited marks in that region to verify her statement. It was shown afterwards that a woman had probed her womb some time (six or eight days) after the injury to the abdomen.

In the matter of an alleged fall, as in descending stairs, in the first weeks of gestation, the ovum is driven out oftentimes, on the principle of forcing a cork from a half-filled bottle by the sudden concussion (Cazeaux). It never occurs in this manner after instrumental interference.

A careful examination as to time is an important element in the case. By a study of the table of contrast it will be seen that the severe symptoms are inverted; that the spontaneous abortion begins without shock, the abortion from manipulation *almost always* with more or less severe constitutional disturbance, or with persistent abdominal or lumbar pain. The shock prevails in the forced abortion, for this reason: the cavity of the womb has been invaded; always with an instrument like a sound, or by an injection of water. Those of us who have injected the cavity of the unimpregnated womb know how liable it is to be followed by pain or shock; how much more persistent must be the symptoms of evil when the cavity of the uterus is injected with a criminal purpose, and is subjected to rough manipulation,

when this — the key organ of a woman's system — is undergoing radical physiological changes. The instrumental abortion often has expulsive pain immediately following the interference. The spontaneous or accidental abortion never presents this as an initial symptom. The reason is clear. If an injection has been used by the fœticide, the uterus is at once so circumstanced that demands are made on its expulsive power. The uterus rarely fails to respond to the demand. If the ovum is detached the conditions are still the same.

Another symptom characteristic of the abortion by manipulation, and occurring within a period varying from a few hours to two days, is a marked tenderness of the hypogastrium, often diffused over the abdomen at large, gradually lessening in intensity as it recedes from the region of the pubes. Those who have had experience in this matter tell me that it is truly surprising how rapidly the abdomen will become tender to the touch, and the pulse mount up to the neighborhood of a hundred, and still nothing serious result, after an injection into the gravid womb. The womb, when interfered with at about the third month of gestation, may also be felt enlarged and tender above the pubes; but this symptom is not so common as hypogastric tenderness, which is rarely, if ever, absent.

DIFFERENTIAL DIAGNOSIS.

Accidental and Spontaneous Abortion, to the Third Month.

Ovular abortion may occur and simulate dysmenorrhœa. Later; a gradual climax of symptoms, thus: loss of appetite, depression of spirits, pain in loins, weight at anus or vulva, pain in breasts, followed by hemorrhage and expulsive pains in uterus.

From accident, sharp pain in back, loins, or abdomen; often an interval of

Instrumental Abortion, to the Third Month.

Marked constitutional disturbance from the first. Rigors, fainting or collapse, pain severe in hypogastrium, often extending over the entire abdomen, and marked tenderness on pressure.

Expulsive pains before the hemorrhage. Pain severe in back and in a line from umbilicus to sacrum, pain and

a day or two or more, and then pains renewed violently and bleeding.

Evidence of history; habitual abortion, previous ill-health, or plethoric state.

Often a history of uterine displacement.

As a rule, pulse rarely reaches 100.

As a rule, there are no symptoms of inflammatory complications of uterus or abdominal viscera.

hemorrhage occurring together. Large clots.

Evidence of history. Previous good health. Evidence of habitual abortion absent or doubtful.

As a rule, pulse from 100 to 120.

As a rule, always symptoms of inflammatory complications, tenderness on pressure over uterus. Os and cervix enlarged and extremely tender to the touch.

Now, if the examination of the woman, or her husband, or others, establishes the fact that the severe shock was among the initial symptoms, followed quickly by expulsive pains; and if, in addition to this, the hand to the abdomen gives evidence of marked hypogastric tenderness, we are fairly at liberty to conclude that we have before us a case of forced abortion, notwithstanding the denial of the patient. If the questions to the patient are skilfully put, the above facts may generally be readily elicited; as in most cases they are ignorant of any peculiarity in their case, one abortion being as good as another in womanly eyes.

In this class of cases, there is no obstacle of course to a digital examination, which may afford evidence so completely corroborative of the conclusions based upon the above signs, that the physician may acquit his conscience of any injustice towards his patient. The evidence furnished by the touch is the second source from which we obtain facts as to the guilt of our patient.

One of the first symptoms brought to light by digital exploration is great heat and fulness of the vaginal passage. The rugæ of the vagina are thickened from congestion, and seem to be unusually sensitive, grasping the finger with more or less force. This vaginal hyperæsthesia is generally found associated with abdomi-

nal tenderness. It may be found in the spontaneous or accidental abortion in those rare cases in which inflammatory complications obtrude. Knowing, however, the rarity of such complications in the innocent abortion, we are justified in regarding this as further evidence of criminality.

The os uteri is *always* tender, usually so much so that the most careless observer must remark it. The innocent abortion may, and often does, present the same feature, but rarely the exquisite tenderness of the cases referred to. The uterine pain to the touch is so constantly present, that it is independent of the presence of abdominal pain and tenderness on pressure. It may be present in a few hours after the use of the instrument, but usually is present after the first day. Those who have been favorably situated to study this symptom in the forced abortion, inform me that, although it may be present to such a degree that an examination is impossible, still it is not a reliable datum for prognosis. It is difficult to explain this uterine tenderness, unless we regard it as the result of the inflammatory engorgement, dependent on the untimely and *sudden* demand made upon the expulsive power of an organ entirely unprepared for such an effort.

Coincident with this tenderness of the cervix is an engorged condition of that part of the uterus, which, in all probability, is common to the body and fundus of the organ. This, undoubtedly, is the condition when the uterus can be felt above the pubes. This state of the body and cervix may be present in the spontaneous abortion, but it would not exist to any great extent, unless associated with inflammation.

There is still one more peculiarity of these cases revealed by the touch. This is an oedematous condition of the cervix, in which the margin surrounding the

opening of the canal may be enlarged, giving that soft, bag-like feel peculiar to tissues infiltrated with serum, beyond which the body of the cervix may be perceived smaller than the lips. This is a condition more often met with in the instrumental abortion under the third month, and not of necessity associated with the more serious inflammatory symptoms already mentioned.

This concludes the description of the symptoms which characterize this class of abortions, and from which, I think, if carefully and judiciously applied, we may be able to satisfy ourselves as to the existence of a criminal element in the case, and not be guilty of any injustice to our patient.

(b.) *Those cases in which the sickness is referred to some cause foreign to a pending abortion.* From the nature of things, we would meet this class of cases only among the unmarried; and when the physician is brought in contact with them, the acutest may be at fault. In the first class detection was comparatively easy; but here the woman is making her best effort to defend the remnant of her honor. Not only do we have the cunning of the woman to deal with, but she is often instructed by the abortionist as to her conduct, if it becomes necessary to call in a physician. A man gray and crippled by years, and who out-Herods Herod, I am told makes it a practice to instruct his patrons, who are novices in the mysteries of premature motherhood, how to avoid confessing their shame. How is a physician to distinguish the hemorrhage of an abortion at six weeks from the flow of a menorrhagia or dysmenorrhœa? It is no impeachment of the acuteness of the practitioner to say, that many cases may occur in which it would be almost impossible to discriminate between them. The bloody discharge may clot in both cases,

there may be expulsive pains in both, and tenderness of the abdomen, back-ache, and fever. You cannot find the ovum, if expelled, for the woman cares that you shall not. She will not permit an examination. However, I believe there are but few cases in which procured ovular abortion takes the kindly course of a dysmenorrhœa. With this last disorder, especially after a menolipsis, it is most liable to be confounded. Cases may occur in which the physician, judging from the social position and *known* character of the patient, has no right to suspect an abortion; but in whom foeticide has taken place. It is woman's mission to love, and she may not love wisely among the rich as among the lowly. The patient expects, and rightly too, that the excessive flow of an abortion can be arrested without her medical adviser knowing the real difficulty. If the ovum has escaped and left no remnant behind, the measures which would arrest an inordinate menstrual flow would tend to abate the hemorrhage of an abortion. The same remark applies to pain. It is for this reason, if the patient has been instructed, that she clings to her secret.

The following table will exhibit all we know of the difference between dysmenorrhœa and forced abortion.

DYSMENORRHOEA.

Previous attacks. Pain most severe just before discharge. Pain relieved by the flow. Pain more often ovarian than uterine, except in cases of retention, when the pain is expulsive. Pain in loins and thighs.

Shreds of membrane in discharge.

Fever not severe or pulse high, as a rule.

No dangerous inflammatory complications.

History furnishes evidence of ill-health.

INSTRUMENTAL ABORTION.

Absence of menses two periods or more. No previous history of dysmenorrhœa. Rigors and severe constitutional disturbance. Pain not relieved by discharge. Pain and discharge occur together. Pain more marked in uterus than in ovaries. Tenderness acute over abdomen and uterus.

No membrane in discharge.

Fever, and pulse 100 and over.

Dangerous inflammatory symptoms common.

History of previous good health.

Manner of patient free from suspicion.

Manner suspicious.

Possibly expelled ovum may be seen.

Great reluctance to vaginal examination.

When called to a case of dysmenorrhœa or menorrhagia, what circumstances would lead us to suspect a pending abortion? I believe that if the manner of the patient did not cast suspicion on the case, the character and situation of the pain would. On this point the oral examination of the patient ought to be as rigid as possible, and not excite her fear or hostility. As to the part of the womb which is the exciting cause of pain, Dr. Snow Beck * has given some useful hints. When the cervical part is involved there may be reflected pain in the lower lumbar region, the hips, the iliac, inguinal and hypogastric regions, and the inner part of the thighs. Dr. Graily Hewitt believes this to be true. This would account for pain, in the positions named above, in cases of undue narrowness of the cervical canal. In contrast to this the pain of abortion would be uterine, and radiate from this point to the back and loins. The pain of menstrual retention may be periodic, like those of labor, † but we have this cardinal symptom to guide us,—the expulsive pain of dysmenorrhœa due to menstrual retention is always accompanied by scanty discharge, or by a discharge occurring in gushes, with relief in the pain of some hours, duration; while the pain and discharge of an abortion occur together, the hemorrhage not in any way lessening the intensity of the expulsive pains. Another diagnostic point to be observed in dysmenorrhœa is, that an arrest of a catamenial flow is followed by a marked exacerbation of pain; while in abortion the cessation of the discharge is generally the signal for an abatement of the pain,

* Medical Times, 1851, Vol. XXIII., p. 583.

† Hewitt, p. 118.

or never tends to intensify it. Shreds of membrane in the discharge would at once decide the case in favor of dysmenorrhœa. One word as to the manner of the patient. If the woman is actually suffering from a criminal abortion, the very consciousness of being examined by one whom she supposes able to detect her state, would be apt to lend a peculiar reticence to her statements about symptoms she regarded as characteristic of an abortion. If the patient was in great suffering, the physician would have to settle the matter with his own conscience as to the propriety of wringing a confession from her by means of her fears.

An examination as to the character of the discharge may throw some light on the case. From the menorrhagic discharge being generally free from the severe pain usually found in abortion, except in those rare cases in which a forced abortion would be almost painless, and also being seldom met with in the young and healthy female, I throw it out of consideration. The discharge of an abortion would invariably form vaginal clots, irrespective of quantity, the conditions which render the discharge of the menses uncoagulative being reversed in case of abortion; the discharge of a dysmenorrhœa never clots; if it were so free as to clot, the expulsive pains would cease, or abate; but as a rule the discharge is not coagulable, being so slight usually that the vaginal and uterine secretion prevent. Again, the hemorrhage of an abortion occurs in gushes, synchronous with the expulsive pain,* and at each pause there is a cessation of pain; while in dysmenorrhœa, as already stated, the gush is followed by a considerable interval of freedom from pain. There is generally a periodicity in the hemorrhage of an abortion rarely seen in the disease with which I am contrast-

* Hewitt, p. 67.

ing it. The manner in which the abortion is brought about may also present a symptom quite characteristic. Having taken considerable trouble to ascertain the most common method, I believe an injection of water into the cavity of the womb is the means generally relied on by abortionists. In two cases which I attended, the result of the interference of an abortionist of this city, the symptoms were begun by the discharge of water tinged with blood for some hours before actual hemorrhage commenced. Both cases were at the third month of gestation. If called to a case of alleged dysmenorrhœa, in which active inflammatory symptoms were present, with acute tenderness of the abdomen, and a pulse at one hundred and twenty or upwards, attended with periodic pain and hemorrhage, I should feel justified in regarding the case with suspicion.

In those cases in which our suspicions lead us to insist upon a vaginal exploration, we gain important information, already referred to in a former part of this paper. In one of the two cases just mentioned an examination was refused, the patient appearing to suffer from severe shock to her modesty. On being kindly reasoned with, she acknowledged her condition, but not until danger was imminent.

In this class of cases, if an examination of the womb be made, the attention should be directed to two points: the dilated os, and the possibility of the ovum or fragment of placenta protruding. If the finger detects a soft, tender, dilated, and yielding os, a state is revealed totally at variance with the conditions essential to dysmenorrhœa. If the ovum was detected in the dilated os, it would at once settle the question. If the placenta, or a fragment of it, presents at the external os, the diagnosis would rest between a polypus or placenta. The previous history would confirm or exclude the idea of polypus.

The sequelæ may tend to confirm or remove lingering doubts. In a case of dysmenorrhœa, after the womb has completed its menstrual molimen, the woman, as a rule, is restored to a condition of comparative comfort; but in the abortion there is generally loitering tenderness of the abdomen, aggravated by standing or walking; often recurring attacks of hemorrhage, from a slight show to severe hemorrhage, independent of any periodicity; dragging at the loins, and a sense of weight at the anus or vulva. These symptoms may persist for an indefinite time. I have no doubt but the family physician is often called upon to treat these symptoms, and without any suspicion of criminal antecedents. The practitioner ought to bear in mind that the instrumental abortion, procured with malicious intent, presents almost always features of malignancy. It is isolated by these features from other accidents of the puerperal state. The innocent abortion is preluded by nature with organic changes which fit the womb for the expulsion of its contents. In the forced abortion demands are made upon a healthy organ for it to instantly violate the laws of its physiological action. This I believe to be the key to the difference between the two cases.

CHAPTER II.

OTHER POINTS IN THE DIAGNOSIS OF INSTRUMENTAL ABORTION.

IN the previous chapter I have endeavored to define the crime as it usually appears when induced by the injection of water into the cavity of the womb. Various methods are made use of to perpetrate this crime instrumentally. In America, when medical men lend themselves out as abortionists, I believe they commonly induce it in the manner spoken of in the opening sentence. In Paris, the puncture of the membranes is generally resorted to. (Med. Chirurg. Review, xxix. p. 604.) Violence of a very different nature results from the two procedures. In one it is the violence of over-distention. In the other, direct injury is done to the membranes, and the violence of lessened distention -- a sudden withdrawal of the normal distending force. These measures, having such opposite mechanical results, must, from the nature of things, produce a difference in the resulting symptoms. It is probable that the majority of the cases of self-probing practised by many women result in a rupture of the amniotic pouch.

Various instruments are used for this purpose. The stylet within a curved tube, a bougie, an iron wire, a knitting-needle, and a piece of whalebone are all of them instruments for rupturing the foetal membranes, or for breaking up its attachments with the womb. It is also probable that rude manipulation, if the placenta is situated low and anteriorly, may partially or wholly separate that mass from its uterine connection. Fatal results

from self-probing are often heard of. A physician related one case in which a woman inflicted upon herself seven punctures in her womb with a knitting-needle, and fatal inflammation resulted.

When puncture of the membranes is resorted to, the first sign is a dripping of the amniotic fluid, very little pain or shock. A German woman, who, in the fourth month of pregnancy, was operated on in a physician's office by rupture of the membranes, informed me that her person was very wet with the escaped fluid when she reached home. It continued to drip away from her for nearly two days, when pains came on, rapidly increasing in severity until the abortion occurred, early in the third day. This, then, is the distinguishing feature of this form of the crime. If the woman alleges that the abortion came on in the above manner after an injury or fright, we have every reason to believe she is telling an untruth. In case the placenta is wounded, hemorrhage will be coincident with the discharge of the amniotic fluid. Stains caused by the liquor amnii upon the patient's linen, if fresh, might be detected by its spermatic odor and yellowish-gray color. There are no chemical or microscopic tests by which a stain of liquor amnii dried upon linen can be identified. (Taylor, *Med. Jur.*, p. 445, Am. Ed.) In case the neck or body of the womb is wounded by rude manipulation, arterial hemorrhage would be at once evident, followed shortly after by tenderness, heat, and pain, and which so rapidly assumes a grave character that probably the nature of the trouble would soon be evident. The case so complicated would stand thus: without any previous pain to indicate uterine contraction, and in a state of health, there would be a sudden discharge of water from the vagina, with a more or less abundant hemorrhage, steady and persistent like the hemorrhage from a wound, and

this would preclude either a state of active inflammation or an abortion.

Abortion induced by Electricity.—I was shown in the shop of an instrument-maker an instrument designed to throw a current of electricity through the womb. One pole, insulated in a glass tube, was constructed to be placed at the neck of the womb, while the other pole was placed over the abdomen, and thus the organ could be roused into contraction from the direct stimulus of the electric current. To what extent this truly diabolical little instrument is used I cannot say; nor do I know what modification the symptoms of the resulting abortion would undergo.

The instrument-maker informed me he sold them to physicians.

The evidence of criminality furnished by the fœtus after birth requires a brief consideration. When pregnancy has advanced beyond the period of quickening, before any means are taken to procure an abortion, the fœtus may be delivered in a living condition. The fact that an immature fœtus exhibits life, as in cases mentioned by Cooper and d'Angers (Storer and Heard, *Criminal Abortion*, p. 92), after delivery, is a strong evidence of criminality. It would be the exception, as experience proves, for a fœtus to be born living, after four months and under six months of gestation, when the abortion was the result of natural, slow-acting causes.

Whatever may be the factors of a slow-acting natural cause of an abortion, they strike at the root of the viability of the fœtus. It is either a maternal error or a fœtal error, and either is fatal to its tender life. The fact that the fœtus is viable at the time of birth is an indication of the working of some cause other than a slow-acting one. Taking into account those exceptions, which always must be looked for, and in these cases

must be given their due value, the viability of the foetus after delivery must be explained as the result of a suddenly determining cause, either accidental or criminal. If the weight of proof is in favor of criminality, it is strong evidence of instrumental interference, as the use of abortient drugs is in itself a slow-acting cause. If this sign is taken, in connection with the symptoms already given, as corroborative, it becomes of great value. It will be rarely met with, however, as in the married it is unusual to allow gestation to progress so far as to render the occurrence of this sign possible.

On the evidence furnished by shreds of membrane in the discharge considerable embarrassment may arise.

I was called in May, 1871, to see a young married woman, but at that time a kept mistress. She had passed over one catamenia. When I saw her there were expulsive pains, hemorrhage, the formation of small clots, and right ovarian pain. During the night of the third day of the attack, she expelled a substance the nature of which she was unable to determine, and saved it for my inspection. I found what appeared to be shreds of membrane, of a pinkish color, mixed with firm coagulum. The membrane preserved its integrity after repeated washings.

The question arose, was it a dysmenorrhœal membrane, or a remnant of a foetal envelope? My friend, Dr. Van Duyn, examined it under the microscope, and found it consisted of a network of fibrine, interlacing red blood globules. It was simply an anomalous clot. It was of uterine formation, which accounted for its decolorized, membranous character.

When suspicion is aroused of a pending criminal abortion, a slight incident may appear important. We must be careful how we give way to evidence that we do not use all our knowledge to test.

A young unmarried woman may void a dysmenorrhœal membrane under circumstances so suspicious that we deem her guilty of an abortion at once. It is, therefore, important that we should study briefly the nature and appearance of this membrane. The following case is very instructive. Dr. Beatty presented to the Pathological Society of Dublin a membrane thrown off during difficult menstruation by a young married woman, who for twelve months previously, had voided one of these membranes monthly. It resembled in all its appearances a decidua vera of the fourth month. Dr. Beatty said that no obstetrician, however experienced, could take on himself to say that it was not the result of impregnation. (Dublin Hospital Gazette, June 1, 1861, p. 172.)

A dysmenorrhœal membrane is a true membrane, and is not the result of the exudation of coagulable lymph or fibrine upon the free surface of the mucous lining of the uterus. Sir J. Y. Simpson proves it to be the true mucous lining of the uterus, and in which, as pointed out by the researches of Sharpy, Weber, Goodsir, and others, the decidua vera has its origin. (Monthly Jour. Med. Sci., Sept., 1846, p. 161.) Dr. Oldham maintains the same origin for the dysmenorrhœal membrane, and claims priority in his views, as he certainly does in publication. (Medical Gazette, April 16, 1846.) Dr. Granville, in his work on abortion and diseases of menstruation, has figured the membranes from a long series of cases.

The dysmenorrhœal membrane presents features which distinguish it in a marked manner usually. There is in the first place generally, a history of dysmenorrhœa, and fragments of membrane are found on the napkin or in the vessel in the morning. It presents the appearance of true mucous membrane, and it is marked with numer-

ous orifices of the uterine glands. It is sometimes thrown off entire, and has the flattened, triangular shape of the uterine cavity, and a large opening at each angle corresponding to the openings of the Fallopian tubes and the cervix uteri. The external surface is rough and shaggy, the effects of dilaceration from the sub-mucous layer. More usually it is discharged in pieces, and then it will present a smooth or internal surface and the rough external. The smooth surface presents the characteristics of true mucous membrane with its mucous follicles. The membrane is more often discharged as shreds, or in strings, which have to be carefully washed out in order to verify them. The appearance of the rough side with the smooth obverse puts the case beyond doubt. (Monthly Jour. Med. Sci., Sept., 1846.)

The contrast to this of the foetal membranes is evident at once, their thin, transparent appearance, and a different history, and if in case of doubt the microscope test will settle the point. There is more danger of mistaking the decolorized clot for foetal membranes than this cast-off mucous lining. There is moral evidence which the physician should also observe. The mere fact of having his attention called to clots or fragments is an evidence of innocence. Those guilty of the criminal abortion submit the discharge to an examination with the greatest reluctance. By this moral evidence in suspected cases the physician must constantly be prepared to profit. A marked suspicion of the medical attendant, and an unwillingness to have the bed, napkin, or vessel examined, ought to send the physician on a tour of discovery at once. He will oftentimes find enough to reward him.

Diagnosis of retained Placenta.—It is important that we should be able to discriminate between a uterine

polypus and a retained placenta. In the proceedings of the Gynæcological Society of Boston (Journal of the Gyn. Soc. of Boston, May, 1871, p. 273) a case was presented, in which an unmarried girl, seventeen years old, barely out of school, was the subject of alarming hemorrhage, and which forcibly illustrates many of the facts presented in my second (*b*) class of abortions. The girl having suffered an abortion, it is probable no physician was called until alarming hemorrhage ensued, and was then diagnosed as a descending uterine polypus. Two days subsequently Dr. Storer settled the diagnosis by removing with polypus forceps an evidently placental mass. In this case there was a history of regular menstrual periods, which was undoubtedly a fabrication on the part of either the patient or her friends.

As a rule in these cases we should regard with doubt all statements made by the patient or her friends which are at variance with what ought, in the usual order of nature, to be a regular sequence of symptoms.

A very simple means of detection would be a protruding cord; but this I believe to be extremely rare in abortions in the early months, from its extreme shortness and friability. Another sign, still more common, to which our attention, in cases open to suspicion, ought to be alive, is shreds of membrane protruding from the os, and still attached to the placental mass. These may present the appearance of stringy shreds, with uneven extremities hanging free from the external os. No recorded case of polypus is known to the author which would present a membranous envelope; nor no disintegration to which a polypus is liable would result in a membranous fringe.

It is in those cases, however, in which neither cord nor membrane presents, and possibly in which nothing whatever is apprehended by the finger in the examina-

tion, as in the last reference, which makes this question a point of extreme delicacy.

It is possible for a polypus to present the symptoms of an abortion (loc. cit. p. 275); but in that case it is safe to say there would be elements wanting, which, in the criminal cases, would guide us in forming an opinion. It is only to those cases in which a presenting polypus with the attendant hemorrhage might mislead us that an abortion had occurred; or the occurrence of hemorrhage and a presenting tumor at the os, in a young and unmarried girl, might lead us to overlook the *possibility* of a *criminal* antecedent, that we need pay attention.

In the contractile efforts of the womb to expel a placenta, the lowest part of the placental circumference would be the presenting part; this circumstance would render it almost impossible for the smooth, polished, and uniform foetal surface to present at either the internal or external os. The fact that the placenta is usually inverted at term, when delivered, is not an objection to the above, for the inversion occurs in delivery, and not in the act of spontaneous presentation at the os. The touch would thus detect the rough and irregular external surface of the placenta. If the os is sufficiently dilated to admit the introduction of the finger, examination ought to be made of both surfaces of the presenting tumor, and the finger detecting the marked difference in the two placental surfaces, a condition would be revealed which ought to aid the diagnosis materially.

The touch may still further prove useful in cases of doubt, as showing the contrast in properties of polypi and placentaë. In case of mucous polypus, if developed in the cavity of the body of the womb, it is flat, or leaf-shaped generally (Dr. Saexinger, Amer. Journal of Obstetrics, vol. I, p. 232), or pear or club shaped, smooth, soft, and uniform to the touch. In the fibrous

polypus the tumor is firm, hard, and smooth, and as a fibroid always originates in submucous stratum (Dr. Saexinger, loc. cit.), it is consequently covered with mucous membrane, and by small indentations on the surface, caused by obliterated utricular glands. If the fibroid has undergone surface degeneration, there is felt a spongy, felt-like stratum, beneath which may be distinguished the firm and fibrous mass, — a sensation very much like that given by the touch of the os of the gravid womb. The placental characteristics to the touch are marked, — the irregular cotyledons of the uterine surface, the membrane-covered foetal surface, the leaf-like edge of the presenting part, and lastly, a circumstance which I have often remarked, but have never seen referred to, a sense of crepitation under the finger, a sort of spleen-like feel, and which sensation I have explained by the giving away of the elastic walls of placental veins and sinuses.

Evidence from the Areola and Breasts. — Any evidence we might seek from the areola, or increased size of the mammary gland in the young unmarried female, would usually be as difficult to procure as evidence from the vaginal touch. It is probable that in case the breasts were examined but little corroborative evidence of pregnancy could be procured, as the early period at which a young unmarried woman would seek instrumental interference would antedate the period at which the mammary signs attain their full value.

If called to a young woman whom we have reason to suspect guilty of an abortion, it would be well to pay attention to the fact that a scanty lactation may be established from one to two or three days after the suspected abortion. It would be the exception to find this mammary excitement absent after an abortion at the fourth month. Heat and fulness of the breasts may be

evident in an abortion at the third month. It is thus that we may find positive evidence of guilt on the part of our young patient in the condition of the breasts. It would be a difficult point to investigate in a woman thoroughly on her guard; and how closely she watches herself and others none but those who have studied these sinister lines in a woman's character can know. She guards with all the keenness of her quick wit the casket, after the jewel has been stolen, or rather bestowed.

Evidence from Temperature. — Although the temperature of the body taken alone would be of little value as a means of detection, still it ought to be studied in connection with other symptoms, and as indicating a case of a graver nature than the patient will sometimes admit. A simple dysmenorrhœa, unattended with inflammatory complications, would not give an elevation of temperature above the normal mean range. As a means of detecting an inflammatory tendency, or an actually existing inflammation, the thermometer is unerring. In the average of cases of dysmenorrhœa, I believe, the bodily heat is but little disturbed. In one case which I observed thermometrically, but not as regularly as was desirable, the temperature was below the mean 98° or 99° F. (Dr. Sidney Ringer, London Lancet, 1866, p. 115, Amer. Ed.), having a mean range for seven observations of 97.75°. The case was attended with slow, feeble pulse and nervous depression, a condition in which we would infer depressed systemic heat.

The following is the thermometry of a case of dysmenorrhœa, such attacks being habitual, the one observed being one of ordinary severity. The subject is twenty-four years of age, unmarried, spare, and of nervous temperament. The pain in the attacks was mostly ovarian.

Hour.	Thermometer.	Pulse.	Day.
9.30 A. M.....	99.15°	84	1st.
5.15 P. M.....	99.25°	88	
9 A. M.	99°	80	2d.
6 P. M.	99°	90	
8.45 A. M.....	99.30°	80	3d.
5.30 P. M.....	99°	87	
9 A. M.	98.85°	78	4th.
6 P. M.	99.25°	80	

It will be observed that the increase in range reached its maximum on the third day, and was only 0.30° above the normal standard of Ringer. From the general appearance of the case, I am disposed to think that it was owing to the recovery of the system from nervous shock that the thermometer was at its highest range on that day, the pain being much lessened.

In another case of dysmenorrhœa from obstruction, the temperature was much above the normal. The expulsive pains were strong and regular with much disturbance of the system.

Hour.	Thermometer.	Pulse.	Day.
9.40 A. M.....	98.75°	98	1st.
5 P. M.	100°	120	
8 A. M.	100.15°	116	
6 P. M.	100.25°	120	2d.
8.45 A. M.....	99°	92	3d.

Although the thermometer in these cases cannot be relied on for positive results, still it may be of use, as pointing to some grave disturbance of the system. In the forced criminal abortion we have the factors present which result in a morbid elevation of temperature. In dysmenorrhœa generally the vital forces are depressed by pain and shock. It is rare that it presents an inflammatory hyperæmia sufficiently marked to give rise to a degree of heat that would constitute a symptom. In the absence of regular observations with the thermometer in these cases, I think our experience will place the above observation beyond doubt.

As an evidence that mere pain does not give rise to increase of temperature, we may cite the pain of labor. This may be called healthy pain. In a perfect normal labor the skin is cool and moist to the touch. It is when the labor deviates from the normal type that increase of temperature becomes a symptom of the error.

In detailing the history of the following cases I have been careful to note the temperature twice daily, with a Colombo and Tagliabue's Fahrenheit:—

CASE I.—Mrs. R—, aged twenty-one, married, the mother of two children, the youngest child seven months old. Says pregnancy was advanced two months, and was "operated" on by a physician who used a syringe, and injected what she supposed was water into her

womb. I was called to attend her on the 29th, at 10.15 P. M. Found a foetus about an inch long in a mass of dark clots with no sign of placenta. On examination by the finger, I found the vaginal part of the neck enlarged and firm. Os well contracted. Womb could be felt enlarged interiorly through the vaginal walls. Examined externally. Womb could be detected enlarged to about twice the natural size, and very tender. Tenderness on pressure over abdomen slight. Was flowing slightly. No pain.

June 30th. Flowing slightly. Os tender, but softer than last night. Uterus much enlarged and tender on pressure. Placenta not yet delivered, and not presenting.

July 1st. Still bleeding slightly. Vaginal part of neck still enlarged and tender. Os not dilated. Womb felt externally, but softer and less tender. Abdomen not tender. Complaints of pains in the pelvis, and heat and straining at the vulva.

July 2d. Uterus still enlarged and tender. Pain in the uterus not so severe. Otherwise in the same condition.

July 4th. Passed several clots this A. M. Os more patulous, but enlarged and tender. Body of womb still enlarged and tender. Had much pain last night in hips and womb. Still bleeding a small amount.

July 5th. On getting up this A. M. passed several clots, which relieved her from pain which had been severe all night. Slight tenderness over the abdomen. Uterus growing less in bulk and softer, but still a vaginal examination gives pain. Os well contracted. Still bleeding slightly. Clots which were passed have been carefully examined by myself, but no placenta or fragments of it have been detected.

July 6th. Was called early this A. M. to the patient, who was flowing rapidly. Found her with strong uterine pains; abdomen tender. Uterus firmer and less

enlarged. Os open and bleeding freely, and about as tender to touch as on the 5th. Tenderness present over the abdomen. Exhibited ergot freely, and toward evening small masses, evidently placental, were passed, but with strong expulsive pains.

July 7th. Patient has not flowed since last night. Tenderness of abdomen gone. Os well contracted and but slightly tender, — still evidently in an engorged condition. Sat up several hours, but suffered from pain through back and pelvis. Seen again in the afternoon, when the womb and abdomen were again tender on pressure.

These cases are given in detail, as I regard the thermometry important. *The following table exhibits the temperature and pulse of*

CASE I.

Day.	Hour.	Thermometer.	Pulse.
June 29th	10.30 P. M.	100.15°	108
" 30th	9 A. M.	99.80°	100
	4.30 P. M.	100°	116
July 1st	10 A. M.	99.85°	92
	5 P. M.	99.85°	98
" 2d	9.30 A. M.	99°	94
	5.15 P. M.	99.25°	97
" 3d	5 P. M.	96
" 4th	9.20 A. M.	99.80°	104
	5 P. M.	100°	112
" 5th	8.40 A. M.	99.50°	98
	5.30 P. M.	99.50°	102
" 6th	6 A. M.	100°	110
	5.45 P. M.	100.15°	125
" 7th	9 A. M.	99.55°	98
	6 P. M.	99.75°	98

CASE II. — Mrs. M. J. I was called to see this case at 1 P. M. of January 9th. She was thirty-two years of age, the mother of three children, the youngest nineteen months old. She was spare, of dark complexion, and bilio-nervous temperament. I found her flowing profusely, with strong expulsive pains, and with a harassing ovarian pain on the right side. The os tender to the touch, soft and slightly dilated. The womb, distinctly felt above the pubes, enlarged and tender. Abdomen slightly tender. Has been vomiting since morning. States that she is at least three months gone, and was "operated" on at different times, beside taking pills ever since she had suspected her pregnancy. The pains continued violent, and bleeding extreme until 6.30 P. M., when the foetus and placenta were expelled in a mass, with an appalling rush of blood. During the course of the afternoon the abdomen was continually growing more tender to the touch, so that after the delivery of the foetus a turpentine stupe was applied to the whole surface of the abdomen.

Jan. 10th, 6 A. M. Patient free from uterine pain. Ovaries painful and tender. Os contracted and extremely tender. Great tenderness in the hypogastrium, and disappearing toward the umbilical region. Still bleeding slightly.

Jan. 11th. Patient in nearly the same condition. Several clots passed last night.

Jan. 12th. Patient suffers severely from pains through the hips and pelvis. Vomits whatever she eats or drinks. Heat and fulness at the vulva. Tenderness to touch still present.

Jan. 13th. Vomiting ceased; generally better.

Jan. 14th. Renewed again the large doses of opiates, to control pain and tenderness, which were omitted yesterday. Hemorrhage ceased.

Jan. 15th. Tenderness and pain well under control. Improving.

Jan. 16th. Improving. Mixture of turpentine and lard, as an application to the abdomen since the 13th, discontinued.

Jan. 17th. Ceased attendance. Patient still weak, and with occasional attacks of lumbar pain.

TABLE OF TEMPERATURE IN CASE II.

Day.	Hour.	Thermometer.	Pulse.
Jan. 9th	2 P. M.	98.85°	98
	7.20 P. M.	99.85°	120
" 10th	8 A. M.	99.80°	100
	5.30 P. M.	100°	104
" 11th	9 A. M.	99.75°	108
	6.15 P. M.	99.80°	100
" 12th	9.20 A. M.	100.5°	116
	5 P. M.	100.15°	120
" 13th	8 A. M.	99.25°	100
	5.45 P. M.	99.15°	110
" 14th	9.20 A. M.	99.85°	104
	4.45 P. M.	99.75°	108
" 15th	9 A. M.	99°	106
	5.30 P. M.	99.10°	104
" 16th	8.45 A. M.	99.15°	98
	5 P. M.	99°	94
" 17th	8.30 A. M.	99°	98

CASE III.—Miss K——, a kept mistress, was "operated" on three times, by a man notorious as an abortionist, by the "injection method," as she called it; was two months pregnant; stated she had been pregnant many times

and had always had abortions procured. I was called to see her on May 7th, four days after the last "operation." Had been flowing slightly for more than twenty-four hours. Slight expulsive pains with more severe pain in the back. Os uteri soft and slightly dilated. But little tenderness over the pubes. Womb could not be felt externally.

May 8th. Condition much the same. Fœtus not expelled.

May 9th. Fœtus and its attachments expelled early this A. M. Lost considerable blood. Os well contracted and slightly sensitive to the touch. Abdomen not tender except to strong pressure above the pubes. Complains of pain in the back. No bleeding at present.

May 10th. Patient easy and comfortable. Hemorrhage just sufficient to color a napkin. Back-ache ceased. Slept well last night without opiates.

May 11th. Complains of pain in the hypogastrium, with a larger show of blood. Os uteri failed to give the touch test of a recent abortion.

May 12th. Free from pain and sitting up.

May 13th. Found patient doing needle-work; said she had been doing house-work in the morning.

May 14th. Patient makes no complaint, and attends to her usual household duties.

TABLE OF TEMPERATURE IN CASE III.*

Day.	Hour.	Thermometer.	Pulse.
May 7th	4.30 P. M.	98.50°	90
" 8th	9 A. M.	99.25°	98
	5 P. M.	99.75°	94
" 9th	9.30 A. M.	99.75°	108
	4.45 P. M.	99.15°	100
" 10th	9 A. M.	98.75°	98
	8.45 A. M.	99°	88
" 11th	5 P. M.	99.5°	90
	9.15 A. M.	99.5°	84
" 12th	5.20 P. M.	98.75°	80
	3 P. M.	99°	80
" 13th	8.45 A. M.	99°	88
	4.30 P. M.	99.15°	85

Although these observations are not sufficiently extended to furnish us data beyond doubt, still they afford grounds for very legitimate probable conclusions. Indeed, the thermometer alone, no matter how extended our observations, — and opportunities are ample if physicians will improve them, — can furnish no positive evidence in the case. It places one more fact in the array of circumstances, which, taken together, amount to such strong evidence of the criminal abortion. It is safe to conclude that these cases will give the following temperature indications as compared with dysmenorrhœa. In non-inflammatory dysmenorrhœa, attended with severe pain and disturbance of the circulation, an elevation of .85° above the normal heat may be met.

In criminal abortion, in the average cases, an increase

above the normal of about 1.15° will be found, as the maximum elevation. That the increase of temperature in the two cases presents the following differences, (*a*) of intensity, (*b*) duration, and (*c*) sudden variation.

That a *marked* increase of temperature, all things being considered, is in favor of the abortion.

That a prolonged marked elevation of temperature of from five to seven days is in favor of the abortion.

That during the persistence of the morbid elevation of temperature, a sudden further increase of temperature, in conjunction with symptoms already noted, is a strong indication of the criminal abortion.

The whole subject of the temperature of the body, during parturition and the state of gestation, remains yet to be studied. We are equally in want of a knowledge of the temperature in long series of cases of dysmenorrhœa. I know of no observations except my own brief notes. It is very probable, that when both subjects are thoroughly studied up, the thermometer in these doubtful cases will be a valuable instrument for detecting the guilty. As this crime seems to be becoming more fashionable, our means of detection ought to keep step with its popularity.

As it is, I fear the crime has advanced beyond the means of positive detection. It is for this reason I have dwelt so long on so many minute points.

CHAPTER III.

ABORTION FROM MEDICATION.

BEFORE this crime of the period was brought within the strict lines of a science and art, it was perpetrated by means of drugs, which by direct or indirect action rendered the womb unable to retain its foetal contents. An examination of the various laws enacted by the different States of the United States, and by England, although covering the crime, however caused, shows that they are framed with particular reference to the procuring of abortion by the administration of abortient drugs. A law passed by the Legislature of the State of New York in 1869, and most stringent in its provisions, and which renders it a penal offence to procure for a woman, whether she be pregnant or not, any drug capable of causing an abortion, with the intent to give the same, is framed with particular reference to the protection of the foetus from any assault upon its safety by means of drugs. The foeticidal drug forms the domestic expedient of the woman in difficulties. It is safe to say that every woman, married or single, when she suspects herself pregnant, resorts to the free use of drugs before she applies to the professed abortionist. Long before the days of Tofana and Brinvilliers woman resorted to poison as her favorite weapon. The innate refinement of her nature sways her in the darkest moments of crime. It is for this reason that all that is best within her resists the gross manipulation of the abortionist. The opportunities a woman has to obtain drugs of this nature are many. I know of more

than twenty-six different preparations advertised and sold for this very purpose. There may be many more, but as I do not purpose to give the names of these advertised female pills it is not important if a few escape our notice. Many of the venders of these drugs make a direct bid for the pregnant woman by the well-known caution for the woman in that condition to avoid their use. Some of these nostrums, either from more liberal advertising, or from the fact that they have the power to, now and then, accomplish the purpose for which they are given, have obtained an enormous sale.

Facts regarding the sale of these drugs in the United States possess peculiar interest in connection with this subject. I have been to great trouble since I became interested in this subject to obtain facts relating to this point. Those who are in a position to know something about the matter refuse to impart their knowledge. I have known druggists, whose information concerning it must have been limited, refuse flatly to tell me anything about it.

I have, however, been able to put together a few figures, — enough to startle any one who has not thought upon the subject.

SALES OF FEMALE PILLS.

For the year 1889.						
Wholesale drug stores in Syracuse, 33 gross packages.						
Retail	"	"	"	"	6	"
Wholesale	"	"	"	Troy,	17	"
Retail	"	"	"	"	7	"
Total,					63	"

These are proprietary preparations, mostly in the form of pills, and in the city of Syracuse embrace some fifteen varieties. The two cities named will aggregate ninety-five thousand inhabitants. The wholesale drug-

stores sell their wares in the neighboring small towns. Without making the calculation, let it suffice to say, based on these figures the amount sold in the United States must be immense. The sum paid for these worthless nostrums must be near a million dollars. This is a large sum, but by the side of the terrible demoralization to body and soul which results from this trade it shrinks into small consideration. The sale of these proprietary articles forms but a part of this trade. I believe there is a still larger trade in counter-prescriptions through the land. Each druggist compounds for himself those drugs he believes to be emmenagogue, and sells them to persons who call for them, at a high price. This is a favorite trick of the trade. I believe it to be a rule with them. There are exceptions, undoubtedly, to this rule, but I do not know more than three druggists of my acquaintance in whose stores such a sale is impossible. The stringent law enacted by the Legislature of the State of New York has placed no restraint on this demoralizing traffic. It is a branch of the business which appeals directly to the cupidity of the apothecary. He sells the prescription which he extemporizes for from one to ten dollars, according to the pecuniary standing of the applicant for relief. [The cool effrontery of young girls and women in speaking to strangers, non-professional, upon this most secret function of her sex is astounding. Having been part owner of a drug store, in a populous city, I speak from personal knowledge. This fact is a striking commentary on the fashionable call for women physicians as the depository of the sexual secrets of the sex.] The apothecary usually compounds from two to five drugs, which he regards as emmenagogue, in the form of mixture, bolus, or pill. I have known of perfectly inert drugs being mixed and sold

to women who applied for abortifacient drugs for a criminal purpose. But generally druggists do not thus trifle with their reputations as skilful abortionists. The temerity with which even respectable druggists will sell violent and noxious drugs to women far advanced in pregnancy forms one of the most alarming features of this trade. This criminal conduct on the part of dealers is sometimes attended with fatal results. In 1866 I attended a colored woman in the city of Troy, who died from pelvic cellulitis, after an abortion at six months. The mixture was procured from an apothecary at Pittsfield, Mass., where the woman had formerly resided. She confessed to having drugged herself for nearly three months with abortifacients. The woman was several years married, and childless.

In 1860 or 1861 a case of this kind formed the subject of official investigation near Troy. The woman, far advanced in pregnancy, procured a mixture of oil of savin, ergot, and aloes, in the form of pills, from a druggist. Death resulted, and a post-mortem section was made. The druggist escaped punishment, alleging, I believe, ignorance of the woman's condition.

The ease with which a woman with criminal motives obtains the means to accomplish her purpose is the main cause of the great trade in these drugs. There is not a single difficulty in her way. There are laws which, if enforced, will check this trade. These laws are not enforced, and I think for this reason: I am forced to believe, that in relation to this crime there exists a moral obliquity in all ranks of society. In more wealthy circles fashion regulates the number of a woman's family; and the poor — their very poverty conferring on them a wealth of maternity — "banish," as I once heard a poor woman call it, unborn little ones, to stint the cry for bread. Now, an ordinance for the sup-

pression or punishment of an offence against society is enacted on the assumption that there exists in every community a certain proportion of law-abiding people. If this assumption is false — and in relation to this crime I fear it is — the laws are simply an array of words, powerless to effect their purpose. I may be wrong, but I believe this crime of abortion is more common in Protestant countries than in Catholic. Among the Roman Catholics the indiscreet maiden receives her crown of motherhood. She has been taught from childhood to bow before the reality of an unborn soul. To the Protestant woman of many sects such a reality cannot exist. The belief finds no place in her heart, that the embryo of coming manhood within her has roused pulses of love not unmarked in heaven.

The liability of an abortion induced medically to terminate fatally is largely in excess of the instrumental abortion. This statement may be proved by the current criminal items of the daily newspapers. I have been some time in collecting twenty-one cases of death from criminal abortion from various newspapers. Of this number ten deaths resulted from the use of abortifacient drugs, five cases implicated medical men, and in six cases no statement was made of the means used. Rejecting those notices of abortion implicating medical men, as very probably induced by means other than the administration of drugs, we have a large majority left, in the greater number of which it is stated drugs were used. Dr. Taylor, speaking of the use of medicinal substances as abortients, says: "They rarely answer the intended purpose, and when this result is obtained it is generally at the expense of the life of the mother." (*Med. Jurisprudence*, p. 433, Amer. ed.) I think my statement of the case above is sufficiently strong, and that Dr. Taylor makes an assertion difficult to prove.

In view of the extent of this trade and the comparative rarity of fatal cases known to the public as such, we can hardly fail to admit that abortion from medication must be practised with success.

An abortion from the use of drugs is more difficult of detection from the spontaneous abortion than one from instrumental interference. When the abortion is the result of the use of noxious drugs it simulates the abortion from natural causes. The series of morbid acts, which stand in the relation of sequence to the abortifacients, slowly culminate. The acme is abortion. The participation of the uterus in these systemic changes must be, partly at least, those which take place in the abortion from natural causes. It is for this reason that those symptoms which stand out in such bold relief in the instrumental abortion are wanting in these cases. So far as the uterus alone is concerned, its condition must be nearly alike in both the spontaneous abortion and one from the effects of drugs. In both the foetus is expelled non-viable as a rule. The viability of the foetus is destroyed, not from any direct action of the cause, but for the same reason that rendered the womb untenable.

Two conditions may become factors in isolating this class of abortion from those, the result of natural, slow-acting causes, (*a*) time, and (*b*) any peculiarity in the action of the exciting cause.

(*a*.) Time for the exciting cause (the abortifacient) to manifest its individualities. It is evident that the symptoms which result from the criminal use of a drug would loom prominently in the beginning of the morbid acts in contradistinction to the insidious approach and gradual climax of the spontaneous abortion.

(*b*.) The action of any drug or combination of drugs must have its peculiarity of action more or less marked

upon the group of symptoms which result from its use: Abortifacients may be divided into three classes: —

(a.) Those which act directly on the womb.

(b.) Those which act reflexly by the irritation of some usually contiguous organ.

(c.) Those which are combined pharmaceutically and unite the action of (a) and (b).

Our study of criminal abortion from medication will turn on the pharmacodynamics of the drug employed. To base its diagnosis on any other ground would lead to error. (a.) Those abortifacients which act directly on the womb and render it untenable are few in number, and some of them of doubtful power. It will be important for us to inquire, when, and to what extent, is the womb capable of this direct stimulation of its expulsive power. Let us take ergot as the type of its class. Its physiological action on the non-striated muscular fibre is the source to which we now refer what was formerly regarded as its elective power on the uterus. There are well-grounded doubts as to the power of ergot alone to accomplish an abortion in the very early months of gestation. The uterine mechanism subject to the excito-motor action of ergot is deficient in those months. The unimpregnated womb is slow in its expulsive movements. Its capacity for motor efforts is limited by its state of non-development. Many observers have expressed their doubts of the ability of ergot to cause abortion in those months; Warner, Villeneuve, Chatard, and others. (Neal, Recherches, etc. Pereira, Mat. Med. vol. ii., p. 68.)

I am more inclined to ascribe any influence it may have on the hemorrhage of an unimpregnated womb to its action in lessening the calibre of uterine blood-vessels, — the analogue of its action in hemoptysis, — than to any power it may have on the muscular structure of

the organ. The womb, however, at any period of its functional existence being a muscular organ, when reflex irritability is once established, ergot, by almost universal admission, will hasten expulsive efforts in the impregnated womb.

It is our purpose to study the criminal use of the drug. It is doubtful if there is an intelligent woman in any but the remotest places but understands that ergot "will bring on pains." The drug, therefore, generally plays an important part in the abortion. There is more science and skill shown in the management of the drugging than is usually supposed. After pills and teas and foot-baths, including the gin-bottle, ergot is almost sure to be called upon to perform its office.

The study of the detection of the administration of ergot will embrace many points. Ergot is a promoter of neurodynia. Although I have not seen this action of the drug referred to by any author I have yet met with, still I believe it is a common effect of its exhibition. This ergot-neurosis occurred three times in a limited number of cases, and in myself during an experiment. It may be difficult to isolate this condition of the nervous system from what may be called the normal neuralgia of abortion, unless we are aware of, what may on more extended observation prove the rule, that the neurodynia in question attacks nerves not usually liable to pain during labor, or an abortion. Indeed, pain in the track of nerves is what we might expect from its physiological action. I regard it as the result of a nerve-anæmia. Romberg says, "It seems as if pain were the prayer of the nerve for healthy blood." This idea of deficient blood supply holds good in many forms of neuralgia (Dr. C. Handfield Jones, *Clinical Obs. on Functional Nervous Disorders*, Amer. ed., p. 40), and applies with equal force to the neuralgia of

ergotism. The action of the drug on non-striated muscular fibres of minute arterial coats leads to that anæmic condition of the nerve which causes pain in its trunk and peripheric terminations. In the cases observed by me this neuralgic action of the drug seemed to have a selective power over the nerves of the extremities. I think this neuralgia of ergotism will explain many of the phenomena attending the administration of ergot in parturition. Among these are the lingering uterine pains unattended by contraction of the organ, after the ergotic contractions have ceased, and an intense neuralgic pain, which is often observed to prelude the expulsive efforts of the womb. Another condition following its use in labor, and which is characteristic, is the excruciating pain attending uterine ergotic contractions, altogether out of proportion to the power of the expulsive efforts.

Pain in the spontaneous embryonic abortion is the symptom which preludes and accompanies the expulsive stage of the accident. So rarely is it present, except as a sense of uneasiness, at any other period, that we may regard this as a rule. I would except from this rule ovarian irritation and slight pain which is so often present when any undue influence is exerted on the reproductive organs of woman. Cazeaux (*Obstet.*, Amer. ed., p. 326) tersely calls the predisposing causes of the spontaneous abortion the "slow-acting causes." We should therefore constantly have our attention alive to the fact that severe uterine or ovarian pain taken singly is rarely seen in abortions from natural, slow-acting causes, in any but the later stages of the process. We then find that in the liability of ergot to excite uterine or ovarian neuralgia, independent of any power it may have to cause expulsive efforts in the womb, we have sure means of detecting its administra-

tion. This neurodynia, to be of any detective value, must be present at a period of the abortion when the expulsive pains would not, judging from the condition of the os, be present. If in addition to this condition we take into consideration the possibility of the drug causing neuralgia of the extremities, of the face or scalp, we have presumptive evidence of its administration. I have, however, hardly been able to make out a case; but I can make the evidence still stronger. Another means of recognizing ergotism is the persistence of its effects. Trousseau and Maisonneuve noticed (Bull. de Therap. iv., 106) as a uniform symptom of ergotism, a dilatation of the pupil. It began from twelve to fourteen hours after administration and continued for *several days*. I have not observed this mydriatic effect of the drug from its legitimate use, still it should always be looked for, as its criminal use implies the conditions essential to the development of mydriasis. These conditions are too large and too frequent doses. Ergot lowers the rate of the pulse to a remarkable degree. Dr. Quinton Gibbon, of New Jersey, found his pulse decline from seventy to fifty-five beats. (Stille, Therap. ii., p. 723.) Arnal found that this action of the drug commenced within an hour, and lowered the pulse from eighty-four to sixty-two, and at an average rate of eight beats in a minute. (Bull. de Therap. xxxvi., 5-34.) Dr. Hardy observed that in the parturient female this effect took place in from fifteen to thirty minutes, and sometimes continued for several days. (Dublin Jour. of Med. Sci., xxvii., 225.) This remarkable action of ergot upon the pulse isolates the drug from all others at all likely to be employed for a criminal purpose. This depressing action on the heart is made evident at the time, when, from the nature of things, we should expect to find marked ac-

celeration of the action of the heart. If, then, in a case of confessed pending abortion, or in a case in which the attempt is made to conceal the abortion under the mask of dysmenorrhœa, we were to find a pulse beating at fifty-five to sixty-five, it would be a just cause for a careful scrutiny of the case.

Another means of detection of the administration of ergot is the use of the thermometer. The pulse-beat ratio is lowered *pro rata*. In some experiments upon myself, to test this point, I found the effect of ergotism upon the temperature marked. Drachm doses of Tilden's ext. ergot were taken at irregular intervals, as business would permit, and the temperature taken with the bulb under the tongue, the scale being read with a mirror. The mean of thirty-five observations before taking the ergot was 98.158° F., which was assumed as the healthy standard; the mean of eighteen observations during ergotism was 96.012° . The thermometer ranged slightly lower on the first day than on the two succeeding days. Two days after, making the fifth day from the beginning of the experiment, the instrument showed a mean range of 97° . Ten drachms of the ext. ergot were taken during the experiment.

And lastly, for the detection of use of ergot in the criminal abortion, we have the sphygmograph. When we take into consideration the marked power of ergot over the heart and its persistence of effects, we have in this instrument an unerring means for the detection of ergotism. The pulse-tracing after ergot is so marked that when the sphygmographic pulse-wave is seen, it is simply a question of some grave pathological condition, or of ergotism. The pulse-trace after the lapse of from one to twenty hours following a dose of ergot presents the following features: (a) diminished systolic distention, (b) increased arterial pressure, (c) irreg-

ularity in the heart's action as shown in the unequal value of the primary wave (Figs. 3, 4, 6), (*d*) the flattened instead of the acute apex of the normal pulse-wave, — the senile pulse of Marey, (*e*) a loss of tricrotism with a tendency to dicrotism and the monocrotic type. The flattened apex indicates, according to Marey, a pathological change in the arterial walls; but in these cases it does not have that significance. The age of the subject would prevent that explanation being given; the gradual return to the normal sharp apex would demonstrate that it depended on some other cause. I explain it as the result of a profound impression on the nervous system. It is also found in the pulse-trace of the insane. These remarkable changes in the pulse occur in less than an hour after taking a dose of ergot; and as shown in Fig. 9 there is the first tendency to a normal tracing after thirty-nine hours and fifteen minutes. Dr. John Van Duyn, of this city, kindly took the tracings for me. The subject was myself. Want of space prevents my giving the details of the experiment.



FIG. 1. — Standard tracing in health, taken twenty-three hours before the experiment.



FIG. 2. — One hour and forty-five minutes after taking two drachms of Squibb's fluid extract of ergot.



FIG. 3. — Two hours and fifteen minutes after.



FIG. 4.—Two hours and thirty minutes after the first dose, and fifteen minutes after taking one drachm of ext. ergot.



FIG. 5.—Two hours and forty-five minutes after first two dr.



FIG. 6.—Three hours after.



FIG. 7.—Eleven hours after.



FIG. 8.—Eighteen hours after.*



FIG. 9.—Thirty-nine hours and fifteen minutes after.

Cotton-root (*Gossypium herbaceum*) is the next drug in common use of this type of abortifacients. A druggist in extensive trade informed me that the sales of ext. cotton-root had quadrupled in the last five years. It is purchased very extensively by small miscellaneous country merchants, who always have the extract among their stock of drugs. The use of cotton-root and its extract is confined solely to its supposed emmenagogue and abortifacient powers. The operation of the drug as a parturifacient, which Dr. Shaw of Tennessee and

* There are intercurrent causes of the lessened value of the primary wave in this tracing. It is given here, as it distinctly shows the ergotic pulse.

others ascribe to it (*Jour. of Mat. Med.* iii., 31), indicates that it has a selective power over unstriped muscular fibres like the ergot. I have no experience with it. Physicians who have used it tell me it has no excito-motor power over the uterus; others whom I know say it has a marked influence over the expulsive action of the womb during labor.

Dr. Bouchelle drew attention to the properties of the cotton root in 1840, only as an emmenagogue however, and stated that the slaves of the South used it to produce abortion, which it did kindly, and without seriously affecting the general health. (*Loc. cit.*) Since that period the drug has been coming into more general popular use. It has seemed to work its way into general favor on its own merits. If it has any powers as an abortifacient the detection of its administration is difficult, with our knowledge of its peculiar action. If what we read of it is true, it makes great dynamic power under remarkable mildness of operation. In order to test any poisonous effect the drug may have when its use is pushed to extremes, I injected two and one-half drachms of Tilden's ext. under the skin of a dog three months old, weighing about three pounds and a half. The injections were in half-drachm doses, under the skin of the abdomen, at the following intervals: 10.43 A. M., 11.30 A. M., 12.45 M., 2 P. M., and at 5.15 P. M. The temperature of the rectum, taken just before the first injection, was 98.8° , and the respirations twenty-eight in a minute. The effects resulting were as follows: at 11.50 the temperature of the rectum was 99.4° , and the respirations thirty-six, and the dog appeared well and playful. At 1.45 P. M., temperature 101.6° , and the respirations forty-four, appearing drowsy, stiff in the hind legs, and the abdomen tender on pressure, which I ascribed to the punctures of the syr-

inge. At 2.10 P. M. breathing labored, condition otherwise unchanged. 3.30 P. M., lying down, disinclined to exertion, drowsy but not sleeping. 4.20 P. M., temperature 102.5° , respirations forty-eight, thirsty and uneasy, eyes dull and heavy, breathing labored. 6 P. M., sleeping soundly, with hard, long respirations, temperature 103.8° . 9 P. M., still sleeping, but on a smart shaking roused up and drank freely of water, great thirst. There has been no effect on the pupil at any time. The next morning, at 7 A. M., the dog was playful and eat a hearty breakfast, and appeared well during the day, the temperature having returned to 99.4° at noon. In the evening the little animal made his escape from my inhospitable office, — the result apparently of a carefully matured plan. I questioned a girl, who admitted its use in table-spoonful doses every two or three hours, with no effect, as she stated, except to cause her to sleep a great share of the time. She kept up the use of the drug — the extract was used — for over a week, and towards the latter part of her experiment she had headache, pain in the back, frequent desire to urinate, attended with burning pain.

I know of but one effect attending its administration which would lead us to suspect its use, — the operation of the drug as a narcotic when freely used. Pending a criminal abortion, when there is any degree of nervous disturbance, as there usually is, there is great sleeplessness. When there is also fear of detection there is a restless vigilance, which is naturally an enemy to sleep. If then the cotton was used freely, we would have a heavy, drowsy condition, hard to explain, especially as the subject would deny having taken any medicine, in all probability. It would be well, under such circumstances, to direct our attention to the general features of the case, surroundings, etc., to which I have

repeatedly referred. Owing to the extensive use of the drug among people criminally disposed it is important that it be more carefully studied.

Extract of cotton-root responds to the following tests, and although rough in their character, still the tests are so ready of application that there would be little difficulty in detecting the extract in the contents of a suspicious bottle in the possession of the patient. Its detection is further simplified by the fact that the extract is used very rarely in combination with any other supposed abortifacient.

(a.) To a weak solution permanganate of potash ext. c. added guttatim turns to a light-brown color, and in ten or twelve hours throws down a brown flocculent precipitate.

(b.) Creosote added guttatim to dilute ext. c. forms a cloudy yellow solution, throwing down on adding water largely.

(c.) Ext. c., to which hydrochloric acid is added (gtt.), forms a pinkish solution:

(d.) Sulphate iron, strong solution, and ext. c. forms an inky solution, which clears up to a bright red on adding hydrochloric acid.

(e.) Solution sulphite soda and ext. c. forms a red solution, which clears up almost colorless on adding acetic acid.

(f.) Solution of sulphuret of potash and ext. c. forms a red solution, which, on the addition of sulphuric acid, causes a pinkish flocculence, which quickly separates into white below and red above, the white flocculence precipitating to the bottom of the test tube after an hour or two, the red suspended at the surface, an almost colorless fluid intervening.

These tests have been repeatedly verified. Various fluid extracts, especially those obtained from roots,

have been subjected to the same reagents and have failed to respond in like manner. The test (*f*) seemed to be the most characteristic. No other extract treated in the same manner gave a reaction at all liable to be mistaken for it.

CHAPTER IV.

REFLEX ABORTIFACIENTS.

REFLEX abortifacients (*b*), which act as abortifacients by reflex irritation from a (usually) contiguous organ, embrace all those agents, which, by irritation of the pelvic viscera, stomach, or intestines, or by a toxical effect upon the system, induce changes in the circulation or innervation of the womb, and render it untenable of its foetal contents.

Aloes. — The drug which may stand as the type of the reflex abortifacient, is aloes. It is rarely given unless in combination. It forms a leading ingredient in all the emmenagogue pills sold as proprietary articles. I believe that if those nostrums known as female pills ever succeed in causing an abortion, it is through the abortifacient power of the aloes. The dose of these pills is uniformly large; and when taken in the full dose stated in the printed directions, a powerful cathartic effect is produced. The dose is repeated from two to three times a day, and the use of the nostrum is continued from one to two weeks. This is the manner in which they are employed when the intent is criminal. The result of this excessive medication is a profound impression upon the circulation and innervation, especially of the pelvic contents. This hyper-catharsis causes great tenesmus, and hemorrhoids, syncope, and trembling limbs. In one case which came to my knowledge, the poor, misguided child — for she was but little more in years — took repeatedly doses of fifteen pills,

of the kind called "Sir James Clark's," in her desperate anxiety. The only result was hyper-catharsis and extreme prostration, and months after, her health was not restored. Disastrous as were the effects, the case presented a strong comic element. The girl was not pregnant, and all her pain was the result of a false alarm.

We cannot gauge the action of aloes as an abortifacient by the effects produced by its legitimate use. When emmenagogue pills, composed largely of aloes, are used with a criminal purpose, they are used to the degree of hyper-catharsis. This condition is prolonged for days and even weeks. When a woman has the courage to persevere in this, it is not a mystery that she aborts, but that any foetus should escape such a determined assault with this weapon.

There are anatomical reasons why aloes used in this manner should prove an abortifacient. Aloes is a powerful stimulant of the lower bowels, especially of the rectum. It also possesses this peculiar trait; stimulant in its general action, rather than sedative or depletory, the circulation being accelerated.* It is not difficult to account for the symptoms resulting from its prolonged use. The excessive tenesmus and heat and fulness at the anus are the result of rectal engorgement. The middle hemorrhoidal artery, and the uterine and vaginal arteries arise from the anterior trunk of the internal iliac. In addition to the juxtaposition of these parts they have a common blood supply. It is difficult to conceive how prolonged hyperæmia of the walls of the gut could occur without the womb and vagina partaking of this state of blood stasis. This is theoretically why aloes is an emmenagogue, as affirmed by the old writers. Not only the direct action of the drug, but

* Stillé, *Therap. & Mat. Med.*, II., p. 570.

the resulting tenesmus, must cause an increased flow of blood down the trunk of the internal iliac, of which the womb, vagina, bladder, and rectum receive their *pro rata* share. Without taking into consideration the theory, that inhibitory nerve action may prevent the sexual organs participating *pro rata* in the rectal hyperæmia, we have just anatomical reasons for regarding the drug as imminently dangerous to the safety of the foetus.

Considered in its reflex relations to the uterus, the drug plays an important part. The extreme of irritation, resulting from its prolonged use, is the very condition necessary to excite reflex motor action in neighboring organs. In the relation of the rectum and uterus we have great intimacy of nerve connection. Although intimate nerve relation is not necessary to the production of reflex motor action, still in this case I claim for it consideration as an important factor. The hemorrhoidal plexus of nerves has a ganglionic connection with the uterine nerves. The motor stimulus from the rectum can be reflected off from the ganglia of the inferior hypogastric, and transferred to the uterine plexus without the intervention of reflex power from the spinal cord.* In addition to this, the spinal cord must be allowed its share as a transferrer of irritation from organ to organ. Clinical observations regarding the use of the drug establish the fact of its great power over the reproductive organs of woman. And even over those of man it has been observed to have a marked influence.† It is more than probable that the well-established value of the drug in amenorrhœa is owing to the fact that the ovaries are included within the circle of reflex irritation. The pregnant womb is then subject to two conditions, which

* Dr. Rutherford on Experimental Physiology, London Lancet, Aug., 1871, Amer. Ed.

† Stillé, loc. cit.

render it highly probable that if these conditions are prolonged, abortion will result, — engorgement from its common blood supply with the rectum, and motor action derived reflexly from ganglia, and from the cord. I attribute then to aloes great power as an abortifacient when used with a determination to accomplish a criminal object. Notwithstanding the fact that the profession are disposed to regard aloes as comparatively innocent, still from the large use made, popularly, of female pills composed chiefly of aloes, I believe people give due credit to the drug.

I will now consider the evidence which would lead to the presumption of the administration of aloes, or of aloetic compounds. It will be necessary, in order to render the signs of any detective value, that the criminal use of the drug be continued to the inception of the abortive process; and there would be thus grafted upon the symptoms of a pending abortion the signs of excessive aloetic purgation. I think I am safe in saying, that when a woman resorts to abortifacients on her own unaided advice, the use of the drug is continued up to the time of the resulting abortion. This is quite evident if we take into consideration the impulsive and impatient nature of a woman in "trouble." It is a curious fact in the history of abortifacient drugs, that, with the exception of Gossypium, they all possess a strong individuality. Aloes is a marked example of this.

The detection of the criminal use of the drug turns upon three points: (1.) The effects of the drug upon the system at large. (2.) The local evidence of its criminal use. (3.) The modification of the symptoms of the resulting abortion.

(1.) *The effects of aloes upon the system at large.*—The drug is an anomaly among evacuants. Its action is stimulant to the circulation, rather than depletory.

This is indicated by increased heat of surface and quickened pulse. This action is also present in the large intestines, as a sensation of heat and fulness along the track of the colon. The urine is scanty and high-colored. These symptoms will often attend its legitimate use. Excessive aloetic purgation is attended with heat and tenderness along the course of the colon, more on the left side than the right, the urine still scanty and high-colored, oftentimes with marked acceleration of the pulse, the result apparently of intestinal hyperæmia. The face is inclined to flush, not to blanch and shrink, as in the case of the drastic or hydragogue cathartics. There are transient shooting pains, and tenderness over the region of the liver, with the sensation of heat and fulness.

(2.) *The local evidence of its criminal use.*—From the marked impression upon the circulation and innervation of the large intestines, it is apparent there would be local evidence of its excessive use. One of the most prominent results is the torturing tenesmus, which I saw in 1867 occurring in a woman whom I had attended in two former abortions, during my student life, and which she denied having procured in any manner. On the occasion alluded to, she told the truth by way of variety, as Gil Blas has it, and confessed having made use of female pills, composed largely of aloes, for over ten days. Such was the torment from the tenesmus that she could lie in one position hardly a moment. She had constant calls for the vessel, passing nothing but a scanty bilious evacuation streaked with blood. She said it was nearly two days since she had taken any of the pills. This would be characteristic of the drug, as its action is slow but prolonged. There is pain in the back, heat and fulness in the rectum and anus, and in the case referred to above there was tenderness on pressure in the hypogastric region. There

may be frequent desire to urinate, dependent upon reflex strangury. A symptom always present is the marked and peculiar odor of the aloetic dejection. Unless great precautions are taken as regards ventilation and cleanliness, the strong odor of the stools will linger for days. This is more marked in the case of small bedrooms, hung round the walls with wearing apparel, as is often the case, the fabrics holding the effluvium for several days.

(3.) *Modification of the symptoms of the resulting abortion.*—We may expect some aid in the detection from the prolonged action of the aloes. After the excessive use of the drug, purgation, attended with the peculiar odor and tenesmus, will continue from twenty-four to thirty-six hours after the exhibition. We may expect in those cases in which aloes has been mainly instrumental in the abortion, the following symptoms: The usual symptoms of a pending abortion, *plus* the presence or history of tenesmus, and a remarkable cathartic action of the bowels, with aloetic odor. Scanty and high-colored urine, uneasiness or pain and heat in the region of the liver, and also along the track of the descending colon, and a presence or history of increased heat of surface and accelerated pulse, in place of the languor and depression which anticipates the innocent spontaneous abortion.

If there is any tendency to hemorrhoids, aloes will quite surely renew them. The existence of piles, in an active state of flux, concurrent with abortion, would be, in my opinion, a just reason to scrutinize the circumstances attending the case. Fluid, or partially fluid, dejection streaked with blood, would also cast doubt upon its innocence. The aloetic odor on first entering a sick-room ought also not to pass unnoticed.*

* Dr. Greenhow speaks of the diuretic action of the drug. (Lond. Med. Gaz. xix., p. 270.) In my own experiments, its effect upon the kidneys was that stated in the text.

Black Hellebore (Helleborus niger.) — This drug is not in popular use in this country as an abortifacient. It is referred to here as it may be used criminally by druggists or medical men. I am inclined to assign to hellebore no more emmenagogue power than any irritating cathartic possesses. Like aloes, it exerts a forcible influence over the uterus by the reflex irritation it excites. Croton oil, gamboge, colocynth, elaterium, and other drastic purgatives, may be used for this purpose. As the symptoms by which their use may be detected depends on their cathartic action, they will be considered together. Any cathartic drug may also be used criminally. I know of one case in which a young woman of bad reputation used a decoction of pink and senna; it produced vomiting, great pain in the abdomen and catharsis, and, strange to say, was followed by abortion; she was advanced five months in pregnancy, and claims she used no other means. It is thus shown that women often exhibit a great variety of resources, and any one of the cathartic drugs in common use may be used criminally. From our knowledge of the action of repeated doses of powerful cathartics, we can readily see how an abortion induced in this manner would simulate in a marked degree the spontaneous abortion from slow-acting causes. No cause can act so powerfully, within the limit of ordinary safety, as prolonged catharsis. The exhaustion, the pallor, and the debility would all tend to corroborate the woman's statement if she alleged an abortion was habitual with her. But, to offset her assertion, there would be facts revealed by a careful examination of the symptoms and history of such a case.

There would be tenderness of the abdomen; persistent borborygmus; a periodical laxity of the bowels, resulting from a constant tendency of the bowels to constipate after the over-stimulation of the purgative, and being

spurred into action again by a repetition of the cathartic dose. There would be wandering pains in the abdomen not at all after the character of the pains of labor. If the hydragogue cathartics were used, there would be scanty urine, a blanched and pinched look about the face, thirst without fever, a history of recurring fluid evacuations, with intervals of freedom from catharsis, and also other features so often referred to in these pages as common to all cases of criminal abortion, however caused.

As hellebore has gained a reputation for efficacy as an emmenagogue, and is generally so regarded by druggists, and also by women who are disposed to seek for foeticidal drugs, it may be proper to say a few words in regard to its special detection. Small doses would cause increased peristaltic motion of the intestines, followed by heat and fulness of the pelvic vessels. In one case in which the tincture of black hellebore was prescribed in combination with ergot by a druggist, and used with foeticidal intent, the woman informed me that she had repeated painful motions, with vomiting on the second day, tenesmus, heat through the hips, and bearing down. She abandoned its use, from the great pain and sickness of the stomach. No abortion was produced. Dr. Massey, of Nottingham, Eng., relates an interesting case of over-dose of hellebore. A teacupful of infusion of the strength of one and a half ounces of the root to twelve ounces of water, was taken in the morning. It produced pain and pricking in the tongue, fauces, and throat. There was a painful sense of constriction and strangury of the throat, pain at the epigastrium, and very violent sickness; much viscid mucus was voided from the mouth. The eyes were sunk; there was excessive prostration of the strength; discoloration about the eyelids. The extremities were cold, and the general

surface was bedewed with a cold clammy sweat. Pulse varied from thirty to fifty beats in a minute, very small and at times scarcely perceptible.* The symptoms following the use of hellebore, in an alleged abortion from innocent natural causes, would probably be sickness and pain at the stomach, large fluid evacuations attended with much pain, heat, and bearing down in the rectum and vagina. Dry throat, sunken eyes, and a pinched appearance of the face. It is possible, of course, that the dose may be so small as not to produce any marked symptoms, but in such a case it is doubtful if an abortion would result. An abortion from cathartic medication is, if it were possible, more the result of violence and shock than an abortion from instrumental interference.

Savine (Juniperus Sabinae).— We have in this potent drug a twofold abortifacient. Whenever a criminal use is made of this drug, it is certain that the maternal life is in danger.

The abortifacient power of savine seems to depend on two conditions: (*a*) its power to cause turgidity of the viscera of the pelvis; (*b*) its exciting action on the rectum and bladder, causing it to act reflexly on the womb. Its toxical effects being characterized by profound insensibility, in their more marked form, from their very nature, can have but little, if any, influence in the expulsion of the foetus. According to Letheby, it has a specific action on the vessels of the lower bowel. This action also extends to contiguous organs.† Vogt says that it produces an apoplectic condition of the foetus. Its toxical effect, so far as it is limited to producing undue engorgement of the venous system, is highly favorable to an abortion. If urged beyond this

* London Lancet, Amer. reprint, 1856, II., p. 337.

† Lancet, 1845, II., p. 142, Amer. reprint.

point, the drug proves fatal, without inducing an abortion. From its use, in dangerous doses, we may learn enough of its action to give us presumptive evidence of its administration. Facts derived from this source, however, would still leave us in doubt as to the evidence of its criminal use, within the limits of safety. Doses of from fifteen to twenty drops of the oil — and to a delicate woman such a dose would be highly dangerous — may be expected to cause the following symptoms: Violent pain in the abdomen, vomiting, and a powerful cathartic action, with tenesmus, strangury, heat and burning in the stomach, bowels, rectum, and anal region; intoxication, flushed face, severe headache, with a sense of constriction in the temporal region. Purging does not always follow its use in dangerous doses.* The drug is highly stimulant to the glandular system, so much so that salivation is often present.† Its odor is clearly evident in the urine, which is increased in quantity, and passed more frequently. It operates as a specific excitant and irritant of the kidneys, and, accordingly, symptoms referred to these organs will become prominent after its use.‡ The pulse is quickened, skin hot and dry. A contracted pupil is generally present during insensibility.§ This symptom may be present under a smaller dose than is usually followed by coma. Distressing hiccough is very generally present. Tenderness, on pressure, all over the abdomen, throbbing of the carotids, severe headache and backache are present. The vomited matter in saviine poisoning is often of a green color, from the presence of altered bile. The powerful terebinthinate odor is always present. I have repeatedly detected it after the legitimate dose of six drops. The drug, even in moder-

* Taylor on Poisons, p. 501.

† Loc. cit.

‡ Pereira, Mat. Med., II., p. 182.

§ Lancet, II., p. 142, Amer. ed.

ate doses, has a marked action on the reproductive organs of woman. In an obstinate case of suppressed menstruation, eight drops *ter die* caused heat and fullness in the parts, and arrested a leucorrhœa, which, however, returned after the employment of savine was abandoned. Its wonderful and apparently direct action on the womb has led Dr. Metsch to prescribe the drug in the prophylactic treatment of "habitual" disposition to abort, from diminished vitality of the uterine system.*

These marked and dangerous symptoms following the criminal use of the drug are rare. When blood is present in the stools, and drowsing comes on, the case is almost certainly fatal, and thus, so far as one phase of the crime is concerned, would be rarely met with. I know of but one recorded case of recovery, that of Dr. Hinds, in which the case terminated in dangerous peritonitis.†

In those cases in which death is threatened from the use of the drug, it is highly probable that the physician would be quickly informed of the nature of the poison, by the patient, if not insensible, or by the friends; as suicide forms no part of the plan. Those cases then, in which the criminal use of the drug is restrained within the limits of safety, will particularly interest us. I made a series of experiments to ascertain the symptoms following different doses of the oil: —

Experiment 1st.—After taking a tracing of the pulse at 2 P. M., a dose of 10 minims of oil of savine was taken at 2.10; in ten minutes there was heat and flushing of the face, a circumscribed pain in each temporal region, heat in the stomach; ideas slightly confused as if from several drinks of whiskey; flatulence. At 4

* Zeitschrift für Geburtkunde; Braith. Ret. xxi., p. 360.

† Times and Gaz., Nov., 1857, p. 524.

P. M., 5 minims of oil were taken. The peculiar odor of the drug was now very evident in the breath. Odor was also present in the urine. At 8.55 P. M., 10 minims of oil were taken; in five minutes there was present the circumscribed pressure sensation in each temporal region, painful heat, and fulness of the vessels of the face, confusion of ideas, flatulence, headache, rumbling in the intestines, great restlessness during the night, with a most severe headache the following day, with slightly congested conjunctivæ. The odor of the oil was freely exhaled by the skin, the night-shirt and sheets smelling strongly of the drug in the morning.

Experiment 2d.—15 m. of ol. savine were taken at 10 A. M.; at 10.20 a stimulant effect upon the brain, evidenced by semi-intoxication; sense of painful stricture over the temples, pulse beating with great force, heat and weight at stomach. 11 A. M., intoxication nearly passed off. Flatulence, with an intense taste of savine, rumbling of intestines, headache, urine passed twice in an hour, slight increase in amount, and savine odor strong. 1 P. M., repeated dose of 15 m. ol. savine; 1.20 P. M., intoxication more marked than in the morning, as also sense of stricture, and pain in head. 10.40 P. M., nausea, and pain in the umbilical region, face painfully flushed and congested. At 2.30 P. M., a free evacuation of the bowels occurred, attended with great pain in the track of the colon, and burning at the anus. Urine passed in small quantities, but frequently high colored and highly charged with savine odor. 3.10 P. M., urine passed frequently, but no strangury; slight nausea, and pain in bowels, pulse full and strong, intense headache, conjunctivæ congested. Temperature of body 100°.2. 3.30 P. M., above symptoms still present; another evacuation of bowels. 5 P. M., headache not so severe; nausea and pain ceased. 8 A. M., passed an almost sleepless night; severe head-



FIG. 1.—Trace taken ten minutes before the savine.



FIG. 2.—Trace twenty minutes after fifteen m. of ol. savine.



FIG. 3.—Trace fifty minutes after.



FIG. 4.—Six hours and forty minutes after first dose, and four hours and fifty minutes after taking five m. of ol. savine.*



FIG. 5.—Twenty minutes after third dose, ten m. of ol. savine.



FIG. 6.—One hour and twenty-five minutes after last dose.



FIG. 7.—Twenty-seven hours and forty minutes after last tracing.

ache, appetite poor, nausea after breakfast. 10 P. M., severe headache throughout the day. No evacuation of bowels. Odor of savine still present in urine.

Sphygmographic characters of the pulse.—Great increase in heart force, and lessened arterial tension, indicating extensive venous engorgement, are the marked features, which, like the head symptoms, will persist for twenty-four hours or more. The heart systolic power is beautifully demonstrated in Fig. 6. Crotism not changed from the normal.

Action upon the system of man.—The following may be safely given as the action of savine:—

* Taken after walking one and a quarter miles to the residence of Dr. Van Duyn.

It enters the blood unchanged. It is thrown off by the skin, lungs, and kidneys. It affects powerfully the vaso-motor system of nerves. It causes hyperæmia of the brain, and (theoretically) of the spinal cord. It stimulates glandular action. It is cathartic. It is diuretic. It is highly irritant. It is stimulant. It is an intoxicant. It is a narcotic, and it increases the temperature of the body.

Detection of its administration seems to depend more on the direct effects of the drug than on any modification it may have power to produce in the symptoms of the resulting abortion. Its remarkable odor, even in doses of 5 m., will be evident in the urine, and when its use is pushed to 10 m. or more, it seems to impregnate the whole depuration of the body. Its terebinthinate smell is in the clothes of the patient, and air of the room, and will be perceptible for twenty-four hours after a full dose. The presence of the odor of the drug about the patient during an alleged dysmenorrhœa, or admitted abortion, ought to excite inquiry. Severe headache, flushed cheeks, or nausea, and especially the pressure-like pain round the head at the temporal region would be an unusual complication, and, as such, ought to receive attention. If the use of the drug is pushed to its cathartic effect, the pain and flatulence, and the peculiar burning pain at the anus, taken in connection with the presence of the odor of the drug, and add to this frequent micturition, with or without strangury, and we would have almost positive proof of the administration of the drug. If the use of the drug is continued until toxical effects are produced, it would be evident that some extraordinary cause is at work, and there would be no difficulty in detecting the poison, as in ordinary cases suicide forms no part of the patient's plan. In nearly all cases the presence of the savine

odor, in connection with the usual symptoms produced by the drug, would be strong confirmation of its dosing, and, as savine is scarcely used in ordinary practice, we ought to regard with suspicion any attempt the patient may make to explain the use of the drug, by a physician's prescription, or as treatment for an alleged complaint.

Tests. — When taken in the form of decoction or infusion it is beyond the reach of chemical tests.* The most common form in which it is used in England, is that of powder. In that case, vomited matter of the color of green-pea soup, or of altered bile, if treated with water the green coloring matter will subside, in a dense insoluble stratum, when, if the color was due to altered bile, the whole of the liquid would remain colored.† If the green matter is washed in water and dried, and placed under a microscope, evidence may be obtained by the rectilinear fibres and the turpentine cells that the substance belongs to the coniferæ.

The oil is that part of the plant which is in the most common use in this country. It responds to the following tests: Stain on paper entirely dissipated by heat. It gives to water an acid reaction,‡ and is insoluble. It forms a milky-white solution with rectified spirits. A clear solution is formed by the oil with ether. Nitric acid in the cold gives to the oil slowly a dark red-brown color.

Tansy (*Tanacetum vulgare*). — This drug in the estimation of women is a potent abortifacient. I am at this writing attending a woman through an abortion who claims it was brought about by taking oil of tansy in five-drop doses three times a day. Women will mention case after case among their acquaintances whom

* Taylor on Poisons, p. 502.

† Loc. cit.

‡ Loc. cit.

tansy "relieved." I have no hesitation in ascribing to tansy abortifacient powers. The popular belief must have some foundation in fact.

In tansy, we are dealing with a drug of remarkable power. Like savine, it may act by causing great engorgement of the venous circulation of the viscera generally, and particularly of the pelvis. It also resembles savine in its action on the urinary organs. Here all resemblance in their action ends. In the cure of amenorrhœa, tansy is justly regarded as highly as savine. They use different means to attain the same end. Savine seems to induce venous congestion, in a great measure, by its irritant properties, while tansy has no irritant action upon the *primæ viæ*, but seems to induce congestion by its peculiar action over the vaso-motor nerves. The fact that tansy fails to induce abortion, even when taken in sufficient amount to cause death, is no evidence against its power as an abortifacient, as its fatal effects follow in such a short time that the womb is unable to respond in any manner to the stimulant.

Tansy has three stages of action, first as a stimulant tonic, as an excitant to the venous circulation, and as a violent poison to the brain and spinal cord, selecting the cord as the field of its primary action. It is the second stage of its action which enables it to rank as an abortifacient. Without being able in any manner to cause expulsive efforts on the part of the womb—thus being called indirect—it may render the organ untenable by inducing uterine apoplexy; or a condition approaching it to such an extent that the womb is roused to action. Women who have used the oil of tansy—and it is not difficult to find them—inform me that they find a heat and fulness through the hips, which increase as they persist in the use of the drug, until

finally they have a "show." I know of one elderly married woman who says that it is the most efficient of the drugs in the early months, and would bring on flowing when all other drugs failed. However true this may be, tansy is a tradition among American women for its certainty as an abortifacient. The oil is largely adulterated. I had trouble in finding a pure specimen for my experiments. Of one specimen of the oil, 95 m. were injected hypodermically at intervals during three hours, and $2\frac{1}{2}$ drachms into the rectum of the same dog, without causing any marked symptoms.

The most marked symptoms of tansy toxæmia are a rapid disturbance of the nervous system, a profuse salivation, immobile and dilated pupils, and severe strangury. These symptoms in animals appear rapidly and together, as shown in the following:—

Experiment I.—Dog four months old. At 9.30 A. M., oil tansy, 3 ii, was injected into the stomach; 10.15 A. M., vomited frothy mucus, appeared dull, passing a few drops of urine as often as every minute, lavish secretion of saliva; 10.25 A. M., pupils dilated and immobile, twitching of muscles; 10.30 A. M., powerful clonic convulsions, ribs fixed, respiration diaphragmatic; 10.35 A. M., passed out of convulsions, stood upon his legs, passed into a semi-cataleptic condition, in which the body remained in an unvarying attitude, consciousness not being lost; 11.15 A. M., began to move about, and rapidly recovered from the effects of the poison; 12.45 P. M., repeated 3 ii oil tansy. Caused no marked symptoms except salivation. Dog remained standing nearly all the afternoon in a sort of cataleptic condition. Next morning quite lively, and ate a hearty breakfast.

Experiment II.—Same dog, four days after above observation, apparently none the worse for experiment

No. 1; 9.40 A. M., injected $\frac{3}{4}$ ss of oil t. into stomach; 11 A. M., convulsions, same as described in Exp. I., as also the same symptoms presented themselves; 12 M., it being evident the dog was recovering from the poison, $\frac{3}{4}$ ss of oil t. was thrown into the stomach; 1 P. M., animal entered into a prolonged convulsion of clonic character, in which death took place, seemingly from paralysis of the muscles of respiration, the dog dying from asphyxia. At 4 P. M., Dr. Van Duyn made a most careful dissection, two hours and a half after death, with the following results: Brain — Large collection of serum under dura mater, veins of the pia mater highly congested, small amount of serum in the lateral ventricles. Cerebellum, its meninges highly engorged, and on section its substance showing numerous centres of congestion. Pons Varolii greatly congested. Cord, large effusion of serum under the dura mater, vessels of the pia mater congested. Lungs congested to a state of hepatization. Coronary veins of heart beautifully mapped out by their engorgement. Heart, left side empty and contracted, right side full of fluid blood. Stomach and intestines gave a strong tansy odor, but no evidence of inflammation. Kidneys congested. Bladder contracted to the dimension of a fluid drachm. Mucous membrane corrugated and congested.

Experiment III.—After taking a preliminary tracing with the sphygmograph, I took 10 m. of oil of tansy in simple syrup. There was an immediate sense of heat in the stomach, and in about fifteen minutes a sense of fulness of the head and face, and the feeling of warmth diffused over the whole abdomen. At intervals of half an hour, tracings of the right radial pulse were taken. In about half an hour there was a slight giddiness, and a marked diuretic action, the urine being strongly impregnated with the tansy odor. The

diuretic action continued during the night, being obliged to rise and urinate,—a very unusual occurrence. The experiment was limited to one dose, and, it will be noticed, double that authorized for legitimate use, in order to observe its influence upon the pulse when taken within the limit of safety.

Experiment IV.—Fifteen m. doses of the oil were taken at intervals of four hours. Two doses were taken in all. After the first dose great heat of stomach and bowels, the face flushed, and after about fifteen minutes a very unpleasant sense of fulness within the head. Half an hour after, urine passed in increased quantity,



FIG. 1.—Standard tracing in health fifteen minutes before experiment.



FIG. 2.—Twenty-five minutes after taking ten m. of ol. tansy.



FIG. 3.—Fifty-five minutes after.



FIG. 4.—One hour and fifteen minutes after.



FIG. 5.—Two hours after.



FIG. 6.—Thirteen hours and fifteen minutes after.

high-colored, and of strong odor of the drug. Pulse 98. Temperature 99°.5 F. Flatulent eructations from the stomach, tasting intensely of tansy. Urinated three

times in the four hours. Three hours after, any unpleasant effects, except the eructations and uresis, had passed away. Second dose. The above symptoms were all renewed. It is doubtful if all the first dose had been absorbed, as in twenty minutes there was ringing in the ears, dizziness. One hour after, there was also a pricking sensation in the extremities, with flashes of heat; a strange fulness and sense of pressure within the head amounting to pain. In one hour and twenty minutes after, the urine produced a slight scalding, and the desire to urinate was constantly present, but not strangury. Two hours after, there was thirst, and a strong desire to draw a full breath, which did not give relief to the oppression in the chest when drawn. The dizziness still continues, but the mind clear, so I think I am observing accurately my condition. Two hours and three quarters after, there were the same symptoms present, the dizziness however being less, as also the sense of fulness of head and face. Pulse 115. Tem. $100^{\circ}.5$ F. Three hours and a quarter after, I am somewhat drowsy. Repeated tansy eructations, and borborygmus. Three hours and a half after, went to bed drowsy but restless, the pricking sensation coming and going over the extremities and along the spine, weight at the stomach, breathing slightly oppressed, sense of uneasiness, but not pain, in the head, constant desire to urinate still present. About five hours after, I took a large dose of opium, which procured me sleep. The next morning there was an occasional eructation of tansy, the urine smelling strongly of the drug, high-colored and until noon often voided. Disinclination for breakfast, but ate a hearty dinner. A dose not much larger than the one recorded above has been known to cause convulsions. In my case I had been living for about ten days in a strong tansy atmosphere, and had gradually

accustomed the system to the drug by former and smaller doses, which may account for the comparative mildness of the symptoms.

Dr. Binkerd records a case in which convulsions and coma and a cataleptic condition followed fifteen or twenty drops as a dose.* There was also heat and burning in the œsophagus; after three hours there was dizziness and numbness, which gradually increased to nearly paralysis. Then convulsions followed by vomiting. The pulse was 90, and pupil dilated. Skin moist and warm, and pain in the head. The comatose condition persisted for an hour. Death always occurs in tansy poisoning, with violent convulsions, which come on usually in about three hours, and seem to terminate fatally from paralysis of the muscles of respiration, and from what I have observed of the condition of the left cavities of the heart, paralytic fixure of the respiratory muscles is the chief phenomenon in the fatal issue. From the sphygmographic characters of the pulse trace, the former opinion that tansy was a stimulant, like narcotics generally in their action, to the heart, is wrong. There is increase in the rapidity of the heart's action, but not in systolic power.

The operation of tansy on man may be epitomized as follows: It acts as a powerful excitant to the cerebro-spinal nerve centre, causing convulsions first, then coma. It is powerfully diuretic. It stimulates glandular action. It increases the heart's action, but lessens cardiac systolic power. It suspends voluntary muscular force in poisonous doses, and, as a final result, all muscular power, and thus causes death by asphyxia.

Detection of its criminal administration.—It may be already seen that a dose of tansy within the limit of safety produces few marked evidences of its use. Small

* Med. and Surg. Reporter, Vol. xxiii., p. 538.

doses will produce a diuretic effect, the urine smelling strongly of the drug. The odor is the most prominent detective sign; the fact that a bottle of the oil is in the room, which has been repeatedly corked and uncorked, will be at once detected by an acute nose. The odor, after a large dose, may be detected in the breath. In an alleged case of dysmenorrhœa, the discovery that the woman has been taking tansy would be sufficient to excite our suspicions, for women have a wholesome fear of the drug, and it is therefore rarely used in a simple menolipsis. Dilated pupils associated with a tansy odor would be an almost positive evidence of its use in a large dose. After a poisonous dose the whole person of the patient is redolent with the drug. If the patient vomits, the matter also smells of the drug, but vomiting does not usually occur unless associated with convulsions. Pricking of the limbs will be present, which may occur in flashes with a sensation of heat, or be localized, and I believe the pricking sensation may result from a dose which is far short of dangerous effects. Numbness may also be present, but is a grave symptom.

Tests.—Peschier isolated from the leaves a peculiar acid, which he calls tanacetic, and which precipitates lime, baryta, and the oxides of lead and copper. In an infusion of the plant, if the acid were present, it may respond in that manner to the above tests. The oil may be extracted by distillation. Dr. Raymond, by distillation of the vomited matter, procured over six ounces of "tansy water."* Ether readily dissolves the oil, which may then be separated for testing by distillation. The oil responds to the following tests:—

(a.) The tansy odor. (b.) It is lighter than water, and deposits camphor on standing.† (c.) The oil set-

* Amer. Jour. Med. Sci. N. S. II., p. 514.

† Wood.

bles to the bottom of the test-tube when agitated with a solution of the bichloride of mercury. (*d.*) It is soluble in alcohol and ether. (*e.*) It forms a cloudy mixture with chloroform. (*f.*) It turns dull red on adding nitric acid. (*g.*) It turns a beautiful aniline red with sulphuric acid.

Rue (*Ruta graveolens*.) — In the absence of positive evidence of the power of rue to effect directly the muscular structure of the womb, it is classed among the reflex abortifacients. It is a potent drug, and although its use in poisonous doses is not followed by fatal effects, still it ranks with tansy or savine as an abortifacient. It is quite popular among American women. The drug holds its place as a domestic expedient in many households. Dr. Helie is of opinion that rue has a direct and elective action on the uterus, and that it may be regarded as a provocative of abortion independently of its irritant and narcotic effects. To support his views of the action of the drug, Dr. Helie gives three cases,* and as they are important, and instruct us as to the symptoms of its administration, I shall give them here.

CASE I. — A young female, dreading her second labor, procured three fresh roots of rue, cut them in pieces, and then boiled them in a pound and a half of water down to three small cupfuls, which she drank on going to bed. Dreadful pain in the stomach came on, with vomitings, and with such oppression that she thought she was dying. This state continued all night; the next day the symptoms were much abated. She then experienced colicky pains, slight at first, but returning with greater severity at intervals. On the evening of the second day they became much more violent. She aborted forty-eight hours after taking the decoction of rue.

* Med. Chirurg. Review, **XXIX.**, 604.

CASE II. — A young woman, residing in a farm-house, was suddenly seized with most severe vomiting, violent twisting pains in the abdomen and limbs, restlessness, and a tendency to delirium. She had all the appearance of being intoxicated. She seemed to be in the seventh month of pregnancy, although she positively denied it. In the course of the following day she was delivered of two infants. Alarming symptoms of poisoning came on afterwards, but these subsided by degrees, and she ultimately regained her health. She afterwards admitted that she had made use of a strong decoction of rue leaves.

CASE III. — A girl, in the fourth month of pregnancy, took for several days a strong dose of the expressed juice from fresh rue leaves. Vomiting, severe colic, great prostration, and a tendency to syncope, somnolence, delirium, and coldness of the whole surface came on. There was also, as in the preceding case, an inflammatory swelling of the tongue, accompanied with a profuse salivation. The expulsion of the foetus did not happen until the sixth day after taking the rue. The acrid-narcotic effects did not cease altogether for another week. Dr. Helic's paper appeared in the *Annals d'Hygiene, Pub. et de Med. Leg.*, xx., 180. Its action in diminishing the force and frequency of the heart's movements appears to be as marked as that of digitalis. In some cases under its influence, the pulse has fallen to thirty beats in a minute. Its peculiar inflammatory influence on the tongue deserves to be remembered. (*Loc. cit.*)

Experiment. — Ten minim doses of oil of rue were taken at the following intervals: at 9.05, 9.30, and 9.55 P. M. After the first dose there was warmth at the stomach, a sense of uneasiness in the head. After the second dose, there was uneasiness in the stomach, pain

in the back, an oppressive feeling in the head, slight confusion of ideas, and occasionally a feeling of faintness. The third dose intensified the above symptoms, the pain over the kidneys was more marked, with an urgent desire to urinate. Flushes of heat passed over the body, and there was an indescribable sense of nervousness, which created a fear that an over-dose had been taken. The urine, when passed, gave a strong odor of rue. The confusion of mind was controllable by an effort of will, as also was the general feeling of nervousness. The pulse was *increased* in frequency. The pupils were normal. The gait was unsteady. The tormina at the stomach was in a great measure appeased by drinking milk. For several hours after the desire to micturate was constantly present. During the night the effect of the rue was that of any narcotic drug upon the subject of the experiment,—but little sleep, and great restlessness. In the morning no ill effects were observed. During this experiment sphygmographic observations were made.

Abortion follows the use of rue in much smaller doses than those mentioned by Dr. Helie. A woman informed me that she used an infusion of the dried leaves, in the form put up by the Shakers, about two ounces to the quart of water, of which she took a teacupful night and morning. It always produced an abortion. She had employed it for this purpose several times. The symp-



FIG. 1.—Standard trace in health.



FIG. 2.—Twenty minutes after taking 10 m. oil of rue.



FIG. 3. — Twenty minutes after 2d dose of 10 m. oil of rue, and forty-five minutes after 1st dose.



FIG. 4. — One hour and ten minutes after 1st, forty-five minutes after 2d, and twenty minutes after 3d dose of 10 m. oil rue.



FIG. 5. — One hour and forty-five minutes after 1st, one hour and twenty minutes after 2d, and one hour after 3d dose oil rue.

toms, as she described them were those resembling the criminal use of savine, or tansy; pain in the back, bearing down, frequent micturition, continuing for several days, and oftentimes attended with headache, when there would be a "show," with colicky pains and abortion, which would follow in a week or ten days from the beginning of the dosing. This is the common form in which it is used, rue being a very popular herb. One reason for the very common use of the herb, is, probably, the great adulteration of the oil. Oils procured from the best houses in New York are so adulterated that no danger attends their use in doses five to ten times greater than that mentioned by the authorities. Rue exerts a remarkable power over the kidneys. These organs seem to be the chief seat of its elimination. A strong odor of the drug may be detected in the urine for twenty four hours after its use in full doses. The breath, for the first two or three hours after its use, is also full of the odor. It will be observed in my experiment that the power of the oil was not exhibited in reducing the frequency of the pulse, although its force was diminished. In an experiment I made with an infusion of the dried leaves,—a Shaker preparation,—of the strength of an ounce to a pint of water, this power to lessen the frequency, as well as the force of the

heart's action, was evident, reducing the pulse from 80 to 69 in about three hours.

In an abortion, the result of the exhibition of rue, in case the drug was used in excessive doses, there would be the symptoms detailed in the cases of Dr. Helie. In more moderate doses there would be syncope, or a tendency to it, drowsing, a reduced pulse, a peculiar feeling of nervous restlessness, back ache and bearing down, and a diuretic effect. There would be a history of a persistence of these symptoms for a week, or even more, before the pains, characteristic of uterine contractions, came on. If the oil were used, its peculiar odor would pervade an apartment for hours afterward. Rue does not possess the strong individuality which is so prominent a feature in most of the other foeticidal drugs. Its use, therefore, in moderate doses would be unattended by the marked effects characteristic of small doses of the potent drugs already considered in this monograph. The use of the rue in any manner approaching an overdose would hardly escape our notice, as the symptoms here detailed would form prominent features in the case.

From my own observations, and from those of others, we may deduce the following as the probable effects of rue on the system of man. It is a narcotic, and an irritant to the intestinal canal. It depresses the action of the heart. It powerfully stimulates glandular action, and acts potently on the kidneys. It has a marked action on the spinal system of nerves, causing spasmodic muscular movements, and possibly an elective power over the muscular structure of the womb. (*Helie.*)

Tests.—Of the infusion of the plant, I know of no chemical test. The oil responds to the following reagents:—

(a.) The oil forms a clear solution with chloroform, alcohol, and ether.

(b.) The solution of the oil in chloroform, treated by

nitric acid, is decomposed, large oil globules floating upon the surface.

(c.) The oil and nitric acid gtt. form a dark red solution supernatant to the discolored acid.

(d.) A solution of the oil in alcohol forms a milky solution with nitric acid, which clears up by boiling, and after a few minutes forms a cloudy pinkish solution.

(e.) Its peculiar odor.

(c.) *Those drugs which are combined pharmaceutically and unite the action of (a) and (b).*

Detection of the criminal use of proprietary nostrums.— I have already detailed the effects of the principal abortifacients, and as they comprise those which usually enter into the composition of the more potent of those preparations which are sold under the name of "female," or "periodical pills," or "drops," this part of the subject may be briefly considered.

Those sold in pill form are, so far as my knowledge of them goes, composed largely of aloes, iron, and powdered savine, or aloes in combination with some more active cathartic. All of the periodical pills when taken in large doses produce a cathartic effect. So far as my observation of this cathartic action of "female pills" extends, it is owing to the presence of aloes. The dose of these pills varies from three to ten, according to the printed directions with each package. It, therefore, follows that when aloes forms a principal ingredient, and is taken in large and repeated doses, the effects of aloetic purgation, as formerly detailed, will be a prominent feature. Hooper's female pills form a good type of the ordinary periodical pill. To avoid repetition, the remarks formerly applied to the detection of the administration of aloes will also apply to these pills. If savine, either in substance or oil, forms an ingredient, it will be evident in the same manner as if taken singly.

It is doubtful if ergot is given in this form whether it will furnish any evidence of its use. The same causes which led to the great difference between the effects of the legitimate and the criminal use of these drugs also apply with equal force here. Women, in using these nostrums, push their use to the same injudicious extreme. They give their confidence with the same reluctance, and exhibit to the physician the same suspicious reticence, and a surprising degree of modesty about functions which possibly may have formed the subject of conversation with her medical adviser a score of times before.

It is important, if the physician is to be an efficient detective, that he becomes familiar with the appearance and the method of putting up for the trade these "periodical pills." Their appearance is characteristic, being the result of an apparent attempt to conceal the nature of the contents of the bottle or box when in use. Thus they are put up in small and partially opaque glass bottles, in square tin boxes, or in small cylindrical tin boxes, covered by a wrapper, but having no label *pasted directly upon the box*. It is important that the country practitioner should become familiar with the effects and appearances of these nostrums, as they are used largely in the country. Several extensive wholesale dealers have informed me to that effect.

We will now consider a far more dangerous class,—those preparations known as "periodical drops."

"Periodical drops" usually number among their active ingredients some of those potent oils already considered, which are not only more certain as abortifacients, but also more dangerous to the life and health of the woman. One specimen, which a lady told me she had taken two teaspoonfuls of, but was obliged to desist because of its irritating effects upon the stomach, was composed of a

dark fluid,—apparently some fluid extract,—upon the surface of which floated about three drachms of oil globules, of a light orange color, with the odor and taste of savine. The dose was from three to four teaspoonfuls a day. I deem this mixture highly dangerous. It is one of the most popular of these mixtures and of which there are large sales.

These fluid mixtures possess a great advantage over the pill form in the facility with which the potent abortifacient oils are mingled in the combination. Those drugs most likely to form part of such mixtures are the infusion or oil of savine, tansy, in infusion, or oil, ergot, and extract of cotton root. From the fact that they are offered to the trade in small packages, it is probable that the oils are used, as indeed could be plainly seen in the mixtures I have examined. The detection of the criminal use of the periodical drops must depend on the nature of the mixture. In the sample referred to, it is evident a sufficient dose of the oil of savine would be taken to cause its physiological effects, and even a poisonous dose may be taken if the bottle be not shaken so as to thoroughly incorporate the oil. The symptoms would evidently be the same as when the oil was taken alone. The nature of the mixture would be betrayed by the powerful odor of either savine or tansy. No pharmacentic skill could cover up the remarkable taste or smell of these drugs. If extract of ergot or cotton root also exists in these mixtures, it is doubtful if the detection of their use is possible with our existing knowledge. If ergot enters into the combination of these mixtures in sufficient amount, which is doubtful, the rules before given for its detection would also apply here.

In the matter of the detection of the criminal use of those mixtures prepared by the druggist himself, and sold over his counter, much would depend upon the dose

given. It is usual in these mixtures to give prominence to some one ingredient. Tansy, savine, or ergot would thus occupy a leading place,—the other drugs which may be present being thrown in with a vague idea that they would in some way aid to bring about the desired result. Iron, in some form, is added very often, from an imperfect knowledge of the action of iron in irregularity of the menstrual function. Powerful cathartics, either in infusion or solid form, are also placed in the mixture, with a better defined idea. When the druggist gives the applicant either of the oils of savine or tansy, singly, it is generally in simple syrup or in mucilage. In this case the peculiar odor would at once indicate the character of the compound. The same would hold true of either the above-named oils in combination. These oils are sometimes prescribed in such minute doses that no effect would be evident from their use. Those men who thus prescribe have the very best of intentions to aid their customer, but are too timid in the use of the instruments. The remarks previously made in regard to the detection of the criminal use of the abortifacients named, apply here.

In regard to the detection of the use of mixtures containing active doses of all the foeticidal drugs, as is sometimes given,—and I know of one druggist who habitually gives such a combination when the parties are “all right,”—we would generally, I think, find a woman sick from the use of a mixture of which she would be unable to give a reliable account. Anomalous symptoms, such as great irritation of the stomach, persistent catharsis, headache, a sharp quick pulse of irritation, if ergot were not present in a full dose, and a frequent desire to urinate, if not strangury. If ergot was, however, present in a full dose, and used as freely as such mixtures usually are, we would have a pulse down as low as 50

or 60 per minute, of a dull, lingering character under the touch, and at the same time the anomaly of more or less acute irritation of stomach and intestines. All these symptoms might exist intercurrent with an admitted pending abortion, or a dysmenorrhœa assumed to exist to cloak the abortion. A mixture of such a nature would be readily recognized if found in the room of the patient, for it would resemble no mixture that a physician in his senses could prescribe, and the combined odor of tansy and savine would at once betray it. Generally, however, druggists give some one abortifacient a leading part in the mixture. If in the pill form, aloes is chiefly relied on. If in the fluid form, some one of the potent abortifacient oils is the principal ingredient. Whichever is used I have already detailed their usual symptoms. It is therefore needless to repeat them here.

Although I have made a separate class (*c*) of the mixed foeticidal drugs, it will be observed that usually the detection of their administration rests upon the operation of one or more prominent ingredients; and thus less able to get at the nature of the compound by a chemical examination, the detection of their administration from the symptoms resulting is not less difficult than when taken singly.

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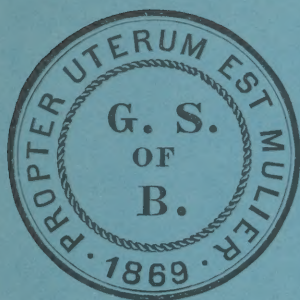
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